HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 78		
L.E.P. 1- 4	Revised to Reflect this revision indicating new,revised, and/or deleted pages	
T. OF C. 3	Revised to reflect this revision	
78-11-02 601- 606	Minor additions and amplification **REVISED INSPECTION/CHECK PROCEDURE OF EXHAUST NOZZLE CENTERBODY ASSEMBLY.**	
78-31-00 501	Minor additions and amplification **CORRECTED P/N REFERENCE FOR LOCKOUT PLATE BOLTS.**	
78-31-00 902	Minor, non technical corrections **DELETED "OR AN EQUIVALENT ALTERNATIVE".** Minor additions and amplification **CORRECTED P/N REFERENCE FOR LOCKOUT PLATE BOLTS.**	
78-32-00 610- 612, 619, 621- 630, 632- 639	Minor additions and amplification **REMOVE ERRONEOUS REFERENCES TO AREAS F AND G IN FIG."FAN REVERSER COMPONENTS".** Layout improved	

CHAPTER 78

EXHAUST

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

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OF TEMP.			
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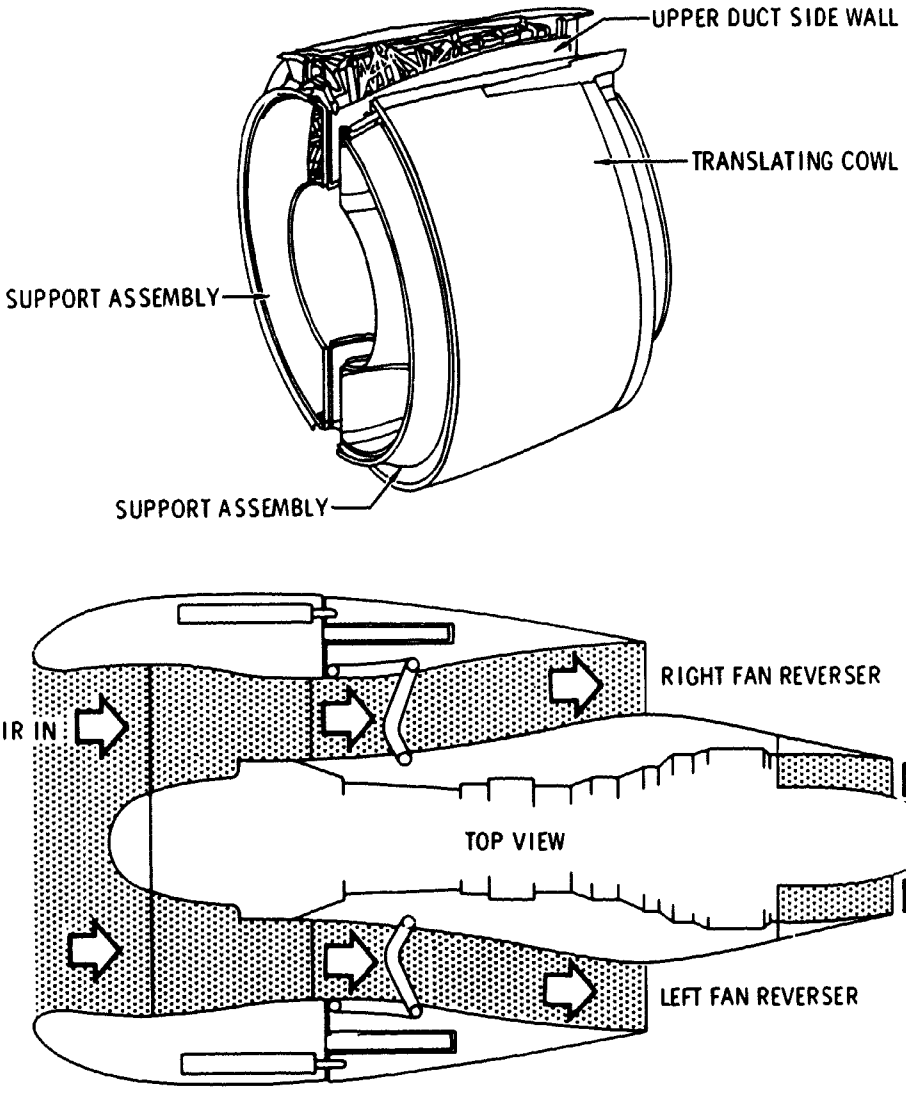
EXHAUST - GENERAL - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001, 002)

Primary air is that air entering the engine near the fan blade platform, continuing through the low pressure and high pressure compressors, the combustor, the high pressure and low pressure turbines and accelerated and exhausted to atmosphere through the primary nozzle. The primary nozzle flowpath is formed by the inner wall of the primary nozzle and the outer wall of the centerbody.

The air discharged from the outer portion of the fan (4/5 of total air) bypasses the core engine and flows through the thrust reverser to atmosphere. In the forward thrust mode, this bypass air is accelerated and exhausted aft to atmosphere by the fan nozzle, which is the duct of the thrust reverser formed by the inner wall of the reverser's translating cowl and by the reverser's fixed inner cowl.

In the reverse thrust mode blocker doors are deployed across the fan nozzle, directing the air laterally, and the translating cowl is moved aft, exposing cascades which redirect the air toward the front of the engine. The reverser is not designed for operation in flight.



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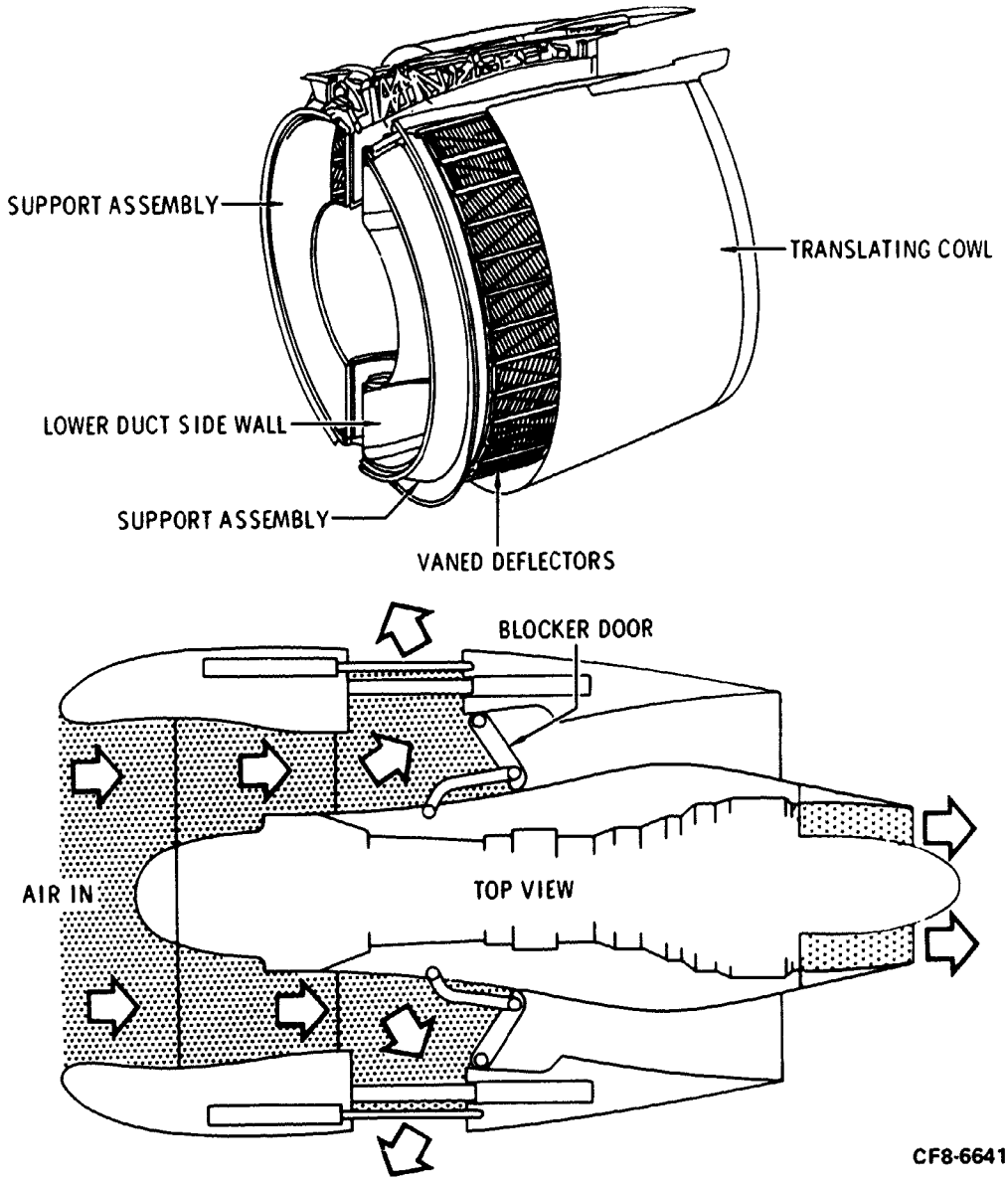
Exhaust/Forward Thrust
Figure 001



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Exhaust/Reverse Thrust
Figure 002

2. Description

The exhaust/reverser system consists of three main subsystems : the fan reverser, the control and actuation system, and the fixed core exhaust nozzle.

A. Primary Nozzle

The primary nozzle assembly consists of a centerbody, a conical nozzle, and an outer barrel fairing.

B. Fan Reverser

The fan reverser assembly forms the fan stream exhaust nozzle when stowed and reverses the direction of the fan stream when deployed. It is constructed in two halves, hinged to the aircraft pylon at the top and latched together at the bottom to permit opening the reverser for engine access or removal. Each half duct forms the inner and outer surfaces that direct the fan air-stream and contains the blocker doors, cascade sections, actuators, a translating cowl and necessary structural components. When deploying, the translating cowl is driven aft, rotating the blocker doors into the fan stream and exposing a series of cascades which turn the blocked air-stream outward and forward.

C. Control and Actuation System

Each fan reverser half assembly is operated by a single pneumatic motor, powered by aircraft Environmental Control System (ECS) air. The motor drives ball-screw actuators through flexible shafts and gears to translate the cowl and rotate the blocker doors. The actuation system is controlled from the flight compartment by a lever hinged to the corresponding throttle control lever.

An electrical indicating system monitors operation of the thrust reverser.

3. Component Location

(Ref. Fig. 003)

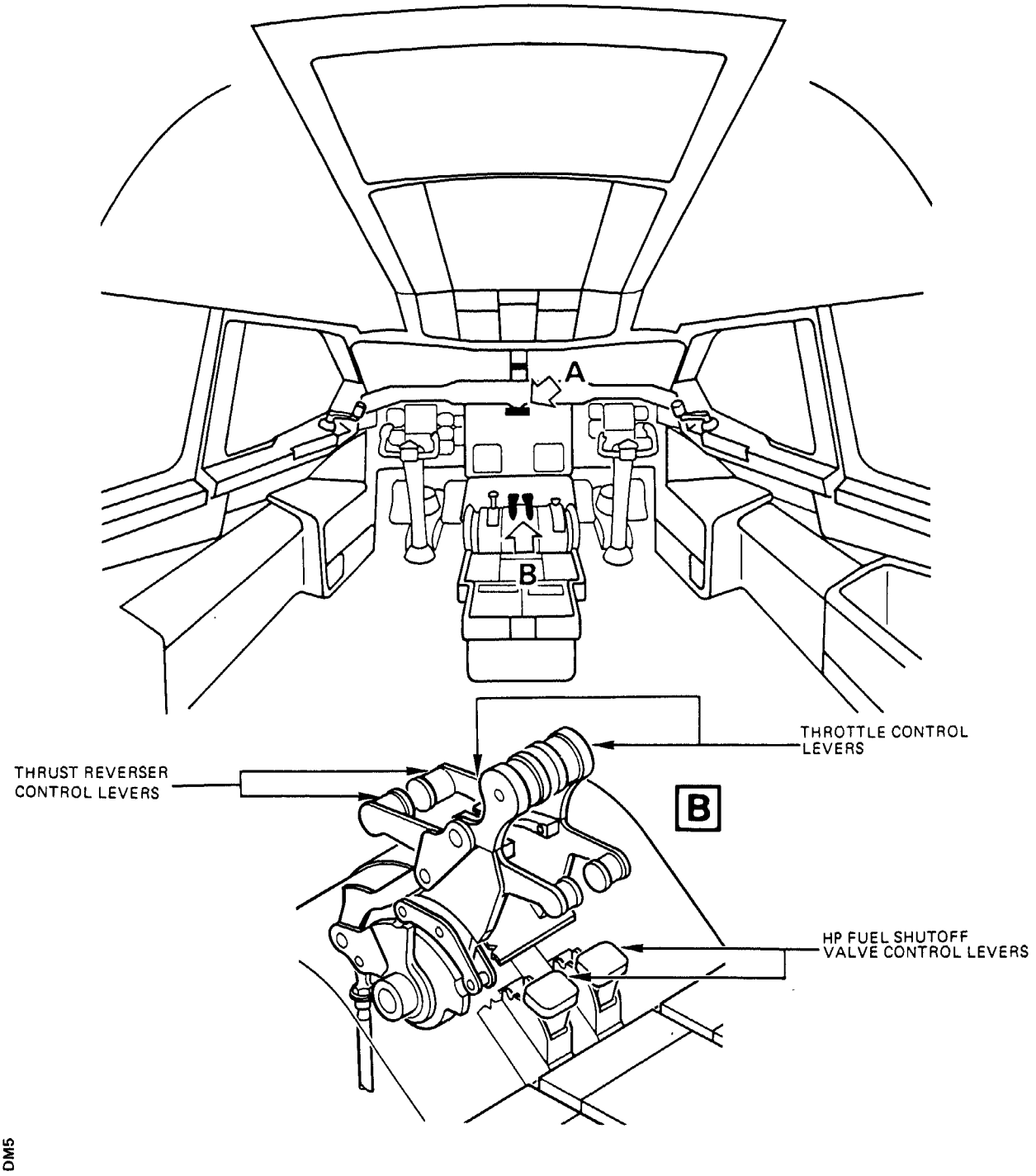
4. Electrical Supply

(Ref. Fig. 004)

5. Control and Indicating

(Ref. Fig. 005)

(Ref. Fig. 006)



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Component Location - Control and Indicating
Figure 003

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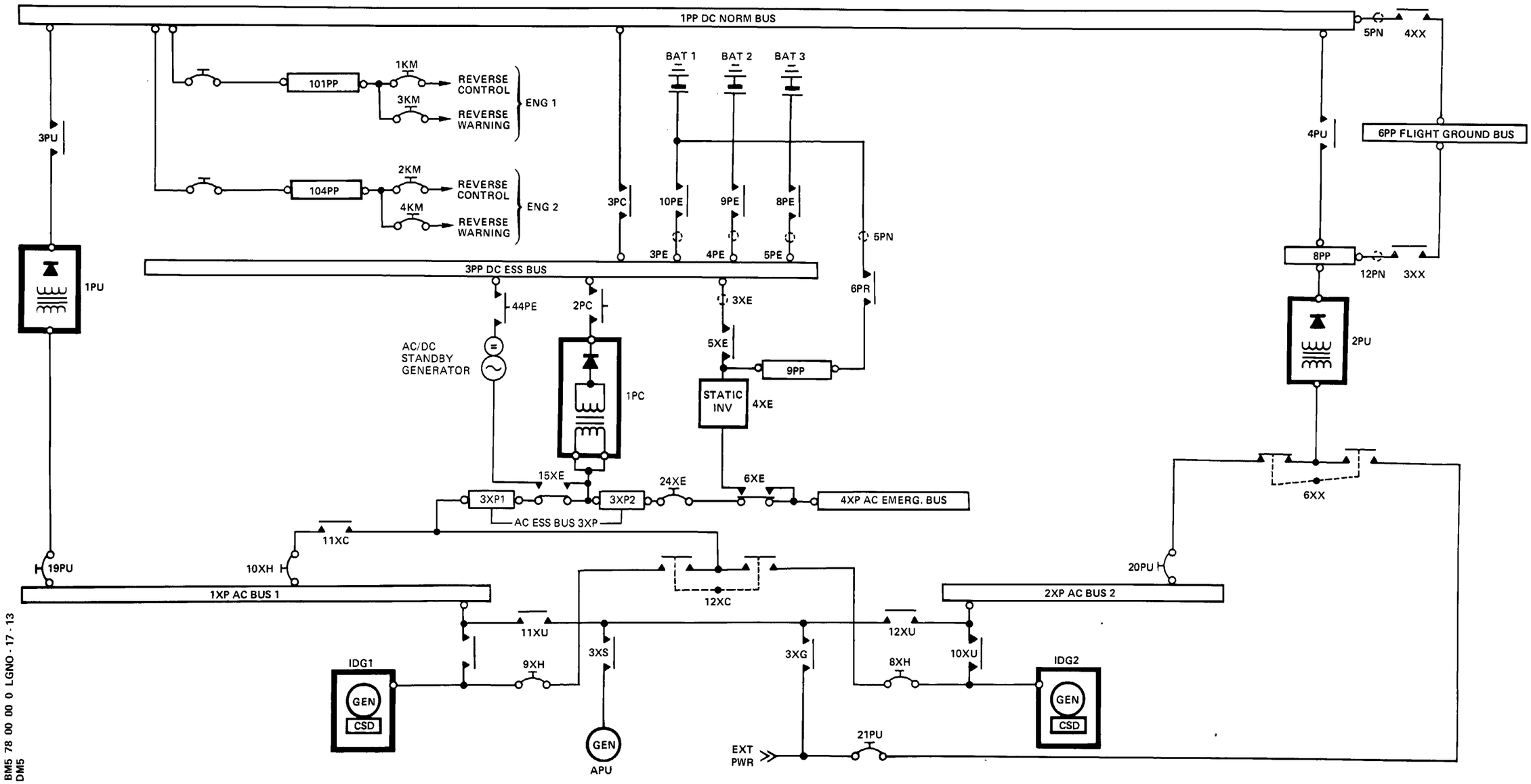

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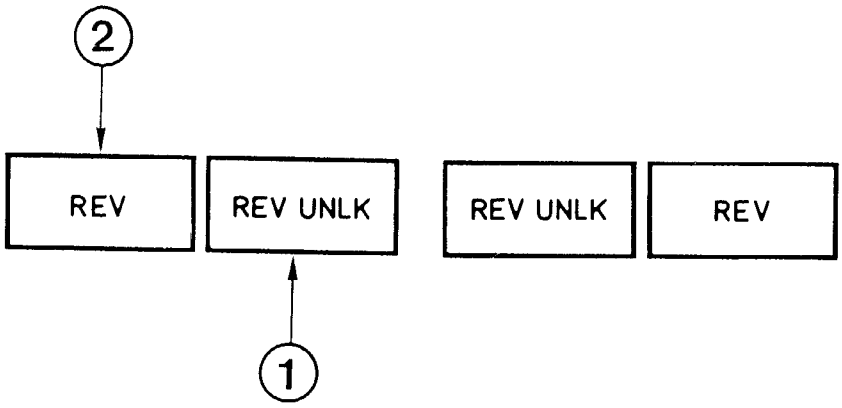
Thrust Reverser - Electrical Supply
Figure 004



1. REV UNLK WARNING LIGHT AMBER
   COMES ON IF THE THRUST REVERSER SYSTEM OF THE CORRESPONDING ENGINE IS NOT CORRECTLY STOWED AND LOCKED.
2. REV INDICATOR - LIGHT (GREEN)
   COMES ON WHEN THRUST REVERSER SYSTEM IS DEPLOYED.

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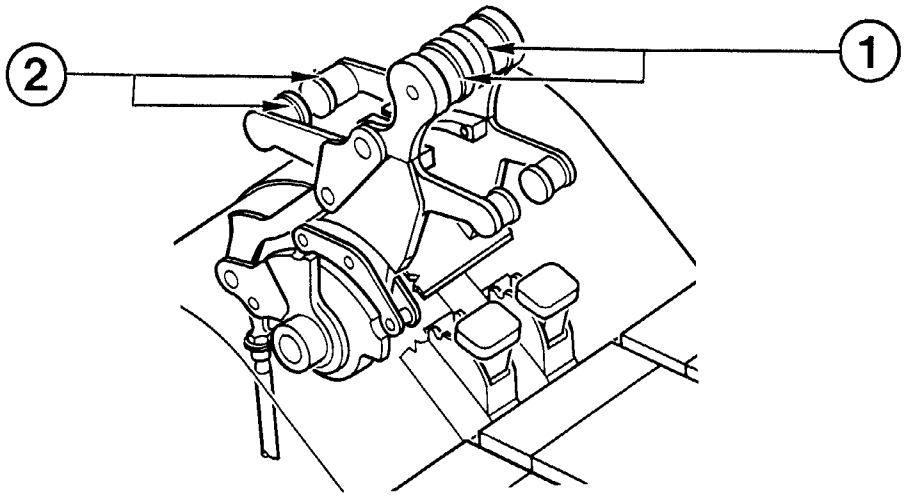
Reverser System Indication
Figure 005



1 - FORWARD THRUST CONTROL LEVER
REF ATA 76.00

2 - REVERSE THRUST CONTROL LEVER
COMMANDS AND CONTROLS OF REVERSE THRUST FOR THE CORRESPONDING ENGINE

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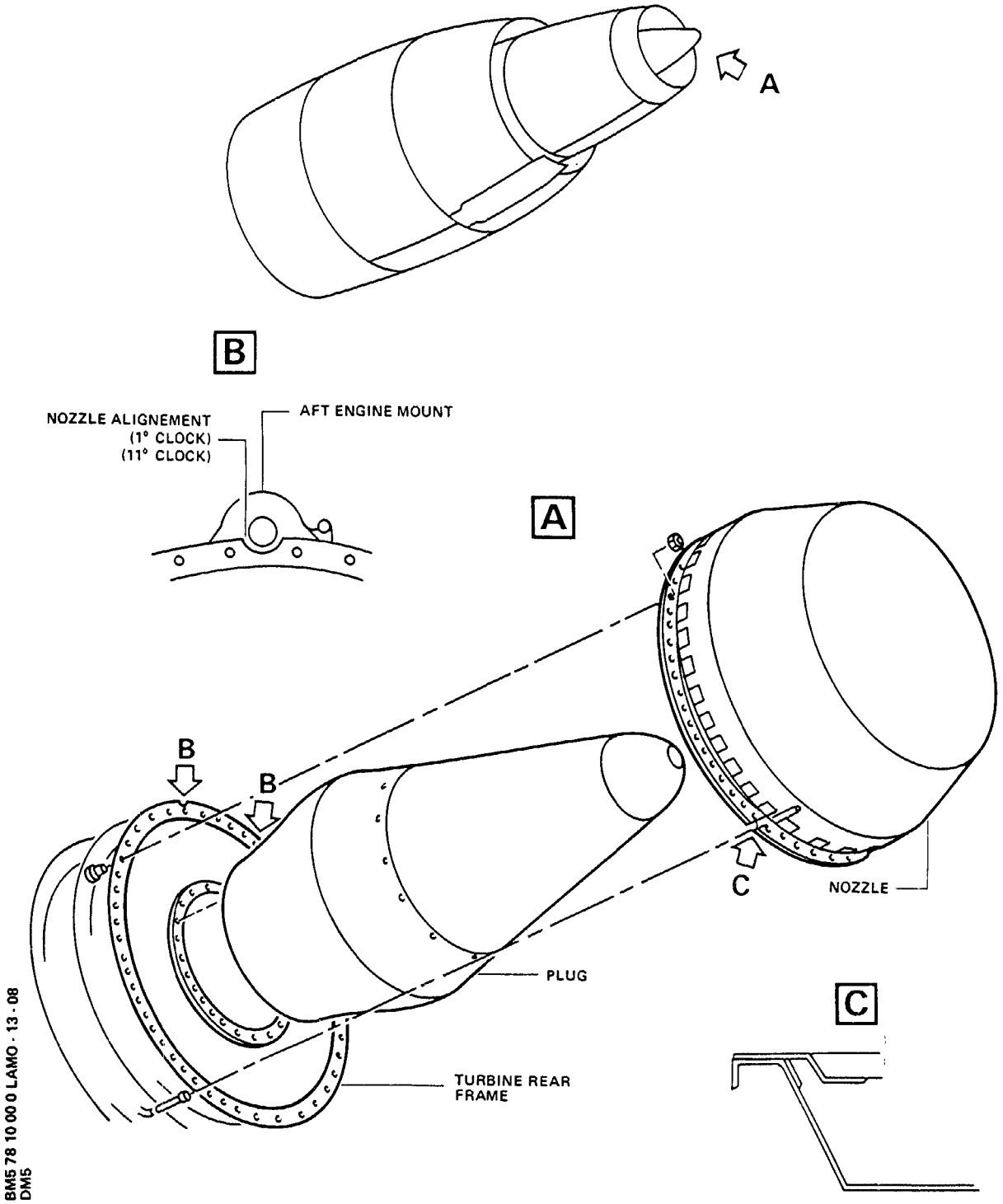
DM5

Forward Thrust and Reverse Thrust Control Levers
Figure 006

COLLECTOR/NOZZLE - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)
   The primary nozzle provides a fixed area annulus for exhausting the core engine gas stream flow and provides a continuation of the aerodynamic cowling from the core cowl interface.
   It consists of an outer cowl and nozzle assembly which attaches to the turbine frame outer flange and a forward and aft centerbody which attaches to the turbine frame hub flange.



Exhaust Plug and Nozzle
Figure 001

PRIMARY NOZZLE ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. This procedure gives instructions for the removal and installation of the primary nozzle assembly.

B. Access to the primary nozzle assembly is through the core cowl doors.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
C. RSE1080	Primary Nozzle Fixture
D. RSE1029	Primary Nozzle Dolly
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 54-55-00, P. Block 401	Lower Fairing

3. Procedure

A. Job Set-Up
(1)Open, Safety and tag the appropriate circuit breakers and open the core cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.
(3)Remove pylon lower fairings (Ref. 54-55-00, P. Block 401).

B. Removal (Ref. Fig. 401)
(1)Remove primary exhaust nozzle as follows :
(a)Remove 4 bolts at each of the three nozzle recoup ducts.
(b)Attach primary nozzle fixture, RSE1080, to nozzle.
(c)Remove bolts, attaching nozzle to engine flange and move nozzle away from engine.
NOTE : The drain tube bracket is attached to the flange interface at the 9 o'clock position.
(d)Lower nozzle on primary nozzle dolly, RSE1029A, and remove fixture.

C. Installation (Ref. Fig. 401)
(1)Install primary exhaust nozzle as follows :
(a)Attach primary nozzle fixture, RSE1080, and remove the primary nozzle assembly from primary nozzle dolly, RSE1029A.
(b)Loosen recoup duct support clamps forward and aft of slip joint prior to installation of nozzle. Applies to all three of the ducts.
(c)Loosen the bolt that attaches the recoup duct bracket and core cowl wear strip to the primary nozzle outer flowpath skin.
(d)Align engine mounted alignment pin with hole in flange and attach nozzle to engine flange with bolts. TORQUE nuts alternately to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(e)Connect three engine tubes to nozzle. TORQUE tube coupling to between

55 and 70 lbf.in. (0.62 and 0.79 m.daN).

(f) TORQUE forward recoup duct support clamp to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN) and the aft clamp to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(g) TORQUE the bolt that attaches the recoup duct bracket and core cowl wear strip to the primary nozzle outer flowpath skin to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(h) Remove fixture from nozzle.

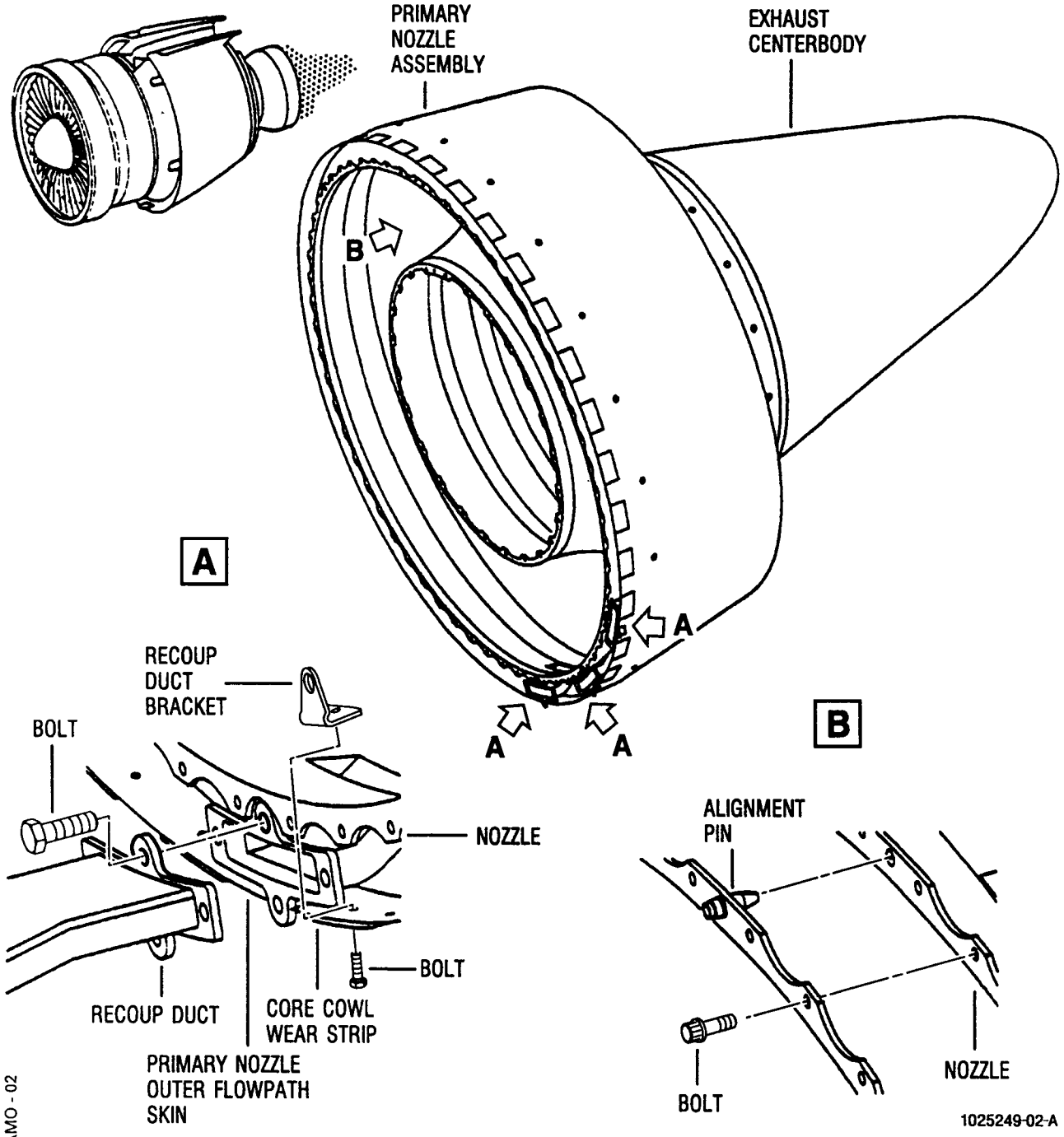
D. Close-Up

(1) Install lower fairing (Ref. 54-55-00, P. Block 401).

(2) Remove access plafform.

(3) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(4) Close thrust reverser and fan cowl doors. Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).



Primary Nozzle Assembly
Figure 401

PRIMARY NOZZLE ASSEMBLY - INSPECTION/CHECK

1. General
This procedure contains the inspection/check of the nozzle assembly attached to the engine and on the wing.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
Referenced Procedures	
- 54-55-00, P. Block 401	Lower Fairing
- 71-13-00, P. Block 301	Cowl Doors
- 78-11-01, P. Block 801	Engine Exhaust Nozzle

3. Procedure

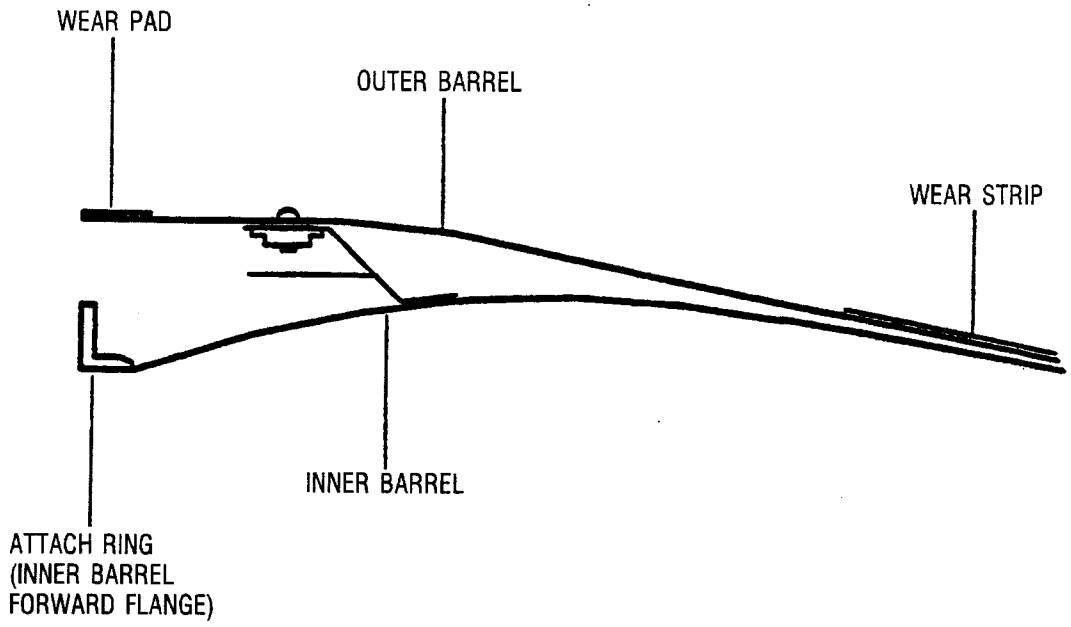
A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.
(3)Remove pylon lower fairings (Ref. 54-55-00, P. Block 401).

B. Inspection (Ref. Fig. 601, 602)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Inspect outer barrel for :		
(a)Cracks	1 in. (25.4 mm) max. length. Total accumulation 6 in. (152.4 mm). Cracks must be seperated by 4 in. (101.6 mm).	Stop drill cracks with 0.06 in. diameter drill at ends of cracks.
(b)Missing/damaged rivets	10 percent may be missing/ damaged. Must be seperated by one good rivet.	Replace rivets.
(c)Dents	0.25 in. (6.35 mm) max. depth.	Reform to smooth contour.
(d)Holes in outer skin	Not serviceable	Bench to provide a smooth contour.
(e)Aft end of nozzle mating surface to Pylon (without rubstrip) wear	0.030 in. (0.76 mm) max depth	Repair per (Ref. 78-11-01, P. Block 801)
(f)Aft end of nozzle mating surface to pylon (with wear strip)	thickness of wear strip maximum	Replace wear strip per (Ref. 78-11-01, P. Block 801)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
wear		
(2)Inspect wear pads for :		
(a)Missing	Up to 4 wear pads may be missing. Missing wear pads must be separated by 3 wear pads.	Replace wear pads.
(b)Cracks	One end may be cracked from 7 wear pads.	Replace wear pads.
(c)Missing or damaged screw or nut	One screw or nut in each wear pad. Ten wear pads maximum.	Replace screw or nut.
(d)Wear	0.060 in. (1.52 mm) minimum thickness.	Replace the wear pads.
(3)Inspect inner barrel for :		
(a)Cracks	0.250 in. (6.35 mm) max. Total accumulation 2 in. (50.8 mm). Cracks must be separated by 2 in. (50.8 mm). Cracks may not extend over brazed hat section flanges.	
(b)Dents	0.25 in. (6.35 mm) max depth.	Reform to smooth contour.
(c)Cracks in the forward flange	0.100 in. (2.54 mm) maximum length. Total length must be 2.00 in. (50.8 mm) or less. There must be 1.0 in. (25 mm) between the cracks	Stop drill the cracks with a 0.098 in. (2.49 mm) diameter (No. 40) drill bit
(4)Inspect Inner to Outer Barrel "Z" ring for :		
(a)Cracks	None allowed	Replace "Z" ring
(b)Missing rivets	None allowed	Replace rivet
(c)Missing nut plates	None allowed	Replace nut plates

C. Close-Up
(1)Install pylon lower fairing (Ref. 54-55-00, P. Block 401).
(2)Remove access platform.
(3)Close fan cowl doors (Ref. 71-13-00, P. Block 301), remove safety clips and tags and close circuit breakers.



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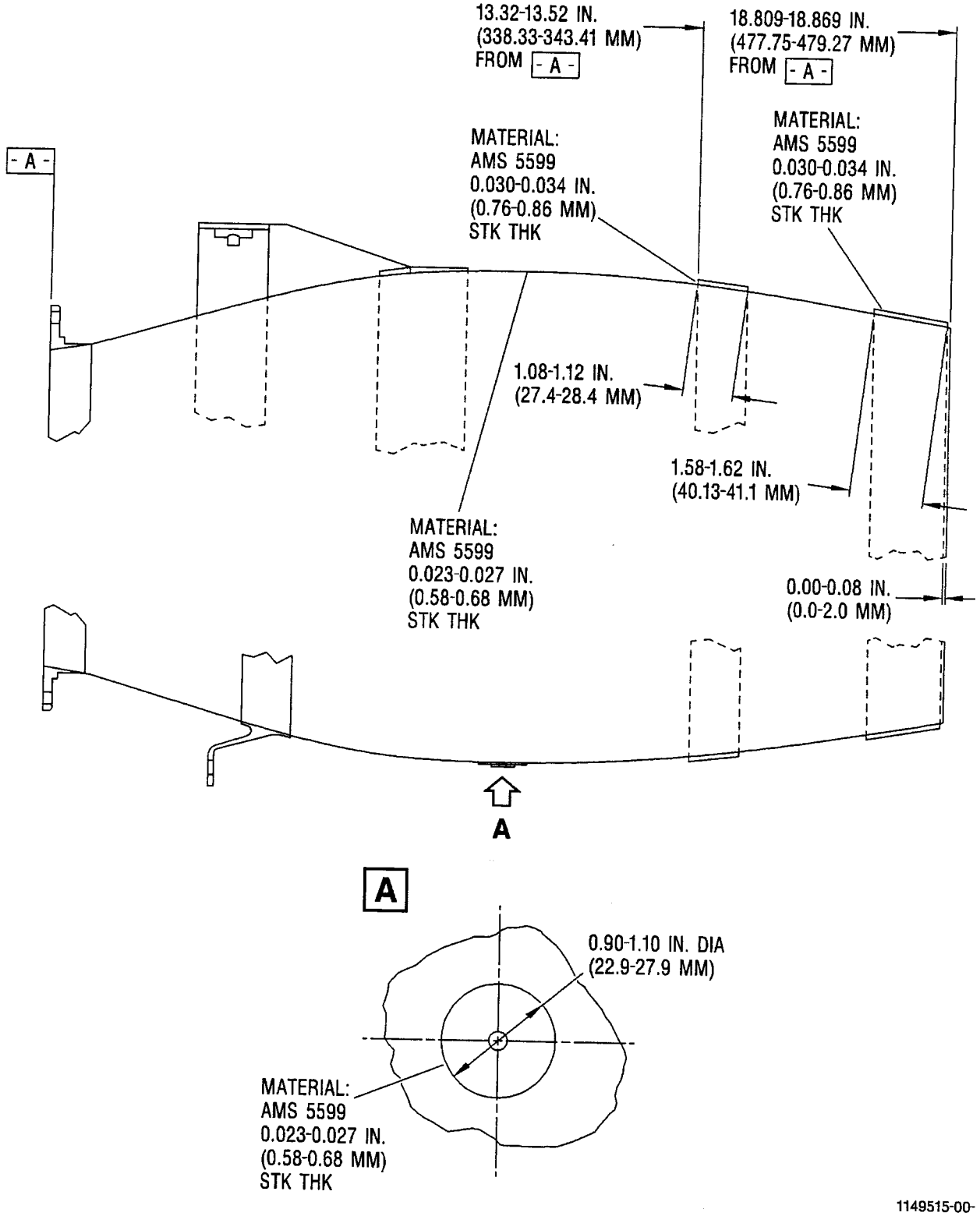
Inner and Outer Barrel Inspection
Figure 601



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Inner Barrel Schematic
(Inner Barrel Removed for Clarity Purposes)
Figure 602

PRIMARY NOZZLE ASSEMBLY - APPROVED REPAIRS

1. General

This procedure pertains to the approved repair of the primary nozzle assembly outer barrel. Access to the primary nozzle assembly is through the core cowl doors.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench
B.	Nozzle Rivet (NAS1200M4-4)
C.	Circuit Breaker Safety Clips
D. Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
E. Material No.C04-003	Cleaning Compounds and Solvents (Ref. 70-00-00)
F. Material No.C05-002	Inspection and Marking Compounds (Ref. 70-00-00)
Referenced Procedures	
- 70-00-00, P. Block 201	Standard Practices - Engine - General
- 71-13-00, P. Block 301	Cowl Doors
- 78-11-01, P. Block 401	Engine Exhaust Nozzle

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the appropriate circuit breakers and open cowl doors (Ref. 71-13-00, P. Block 301).

(2)Remove Primary Nozzle Assembly (Ref. 78-11-01, P. Block 401).

B. Disassemble the primary nozzle assembly as follows : (Ref. Fig. 801, 802, 803)

(1)Match mark the primary nozzle assembly to the outer barrel at the forward end. This match mark will control the circumferential orientation during reassembly.

(2)Remove the 34 wear pads from the outer barrel.

(3)Remove the duct assembly by sliding clockwise to disengage from coupling then remove in the forward direction.

(4)Remove bracket at 6 o o'clock position on exhaust nozzle.

(5)Remove the 20 bolts securing the outer barrel to the inner barrel.

(6)Slide outer barrel aft and remove.

C. Repair outer barrel with a locally manufactured wear plate as follows :

WARNING : GLOVES AND EITHER A CLEAR, FULL FACE SHIELD OR SAFETY GLASSES WITH SIDE SHIELDS MUST BE WORN DURING ALL GRINDING OPERATIONS.

(1)With hand grinding tools, slot and blend the wear area of outer barrel to remove all material less than 0.010 in. (0.25 mm) in thickness, knife

edges, and sharp ends of slots. Radius the slot ends to 0.25 in. (6.35 mm) minimum (Ref. Fig. 801) (View E).

(2)Layout the wear plate position on outer barrel.

(a)Locate the mark at the top vertical centerline at the aft end of the outer cowl. Mark the top vertical centerline through the wear plate installation area (Ref. 70-00-00, P. Block 201), Para. 5. "Top" will be aligned with one of the (20) primary nozzle to outer barrel mounting bolt holes.

(b)Apply Dykem marking ink (C05-002) between 2 of the mounting boltholes near top and to wear plate installation area of outer barrel where the forward edge of wear plate will be positioned (Ref. Fig. 805).

(c)Set up outer cowl with forward end (surface D) down on a surface plate. Shim surface D, if required, to achieve surface A flatness to "best possible condition."

(d)Using a height gage with scribe, lightly scribe a surface A reference line in Dykem marking ink (C05-002) applied between 2 of the mounting bolt holes near top vertical.

(e)Using a height gage with scribe, locate and mark Dimension PF (10.110-10.050 in. (256.8-255.3 mm) from surface A) on the O.D. of the outer barrel to establish the forward edge position of wear plate. Lightly scribe line through a 45° arc circumferentially centered over top vertical centerline.
Record actual Dimension "PF"

(3)Layout the rivet holes in the wear plate (Ref. Fig. 806)

(a)Apply Dykem marking ink (C05-002) to wear plate forward and aft edges (approximately 0.375 in. (9.53 mm) from forward edge and 0.375 in. (9.53 mm) from aft edge).

(b)Locate and lightly scribe axial lines on wear plate at (3 locations), circumferential mid point and 0.270 in. (6.86 mm) from each end of wear plate (Ref. Fig. 806) (View D-D). Mark axial lines on "non wear coated" areas only (forward and aft edges).

(4)Calculate the location of the forward rivet location on the wear plate.

(a)With outer cowl suface A positioned per step 3.C.(3), determine average (8 readings) drop dimension DF (surface A to aft edge of I.D. stiffener) (Ref. Fig. 805).
Record average Dimension "DF"

(b)Calculate distance of forward rivet circle from forward edge of wear plate as follows :
Dimension DF - Dimension PF - 0.27 in.
(6.9 mm) = "X"

(c)Lightly scribe to mark the location of the forward rivet circle "X" from the forward edge of the wear plate.

(5)Calculate the location of aft rivet on the wear plate.

(a)With outer cowl surface A positioned per step 3.C.(3), determine average (8 readings) drop dimension DA (surface A to aft edge of aft stiffener).
Record average Dimension "DA"

(b)Calculate distance of aft rivet circle from forward edge of wear plate as follows :
Dimension DA - Dimension PF - 0.80 in.
(20.3 mm) = "Y"

(c)"Y" = Location of forward rivet circle from forward edge of wear plate.
(d)Lightly scribe to mark the location of the aft rivet circle "Y" from the forward edge of the wear plate.

(6)Drill and debur the rivet holes in the wear plate.
(a)Mark for drilling 26 equally spaced holes for the forward rivet circle and 26 equally spaced holes for the aft rivet circle (52 holes total) starting at the scribe lines 0.270 in. (6.858 mm) from each end of the wear plate.
(b)Using a No. 33 of 0.109 in. (2.77 mm) drill bit, pilot drill (52) rivet holes in wear plate.
(c)Remove burrs from drilled holes.

(7)Apply a coat of plasma spray to a thickness of 0.004-0.007 in. (0.10-0.17 mm) (Ref. 70-00-00, P. Block 201) (Ref. Fig. 804).

(8)Position the wear plate on the outer cowl matching wear plate circumferential mid point scribe line with the outer cowl top vertical mark and the forward edge of the wear plate with the scribe line on the outer cowl (Ref. Fig. 806).

(9)Avoid wear coated area, lightly clamp wear plate in position with "C" clamps.

NOTE : Visually verify that holes in wear plate do not align with existing rivets in outer cowl. Forward rivet holes should be midway between rivets in existing rivet row "E" in outer cowl. Riveting through split line in outer cowl I.D. stiffener should be avoided if possible. Slight circumferential adjustment of wear plate position may be made if required to improve rivet locations (Ref. Fig. 806).

(a)Tighten "C" clamps when wear plate is positioned properly and line drill rivet holes (52) 0.127-0.133 in. (3.22-3.37 mm) diameter in the outer cowl using the wear plate as a template as follows :
1 Starting at a hole close to top vertical centerline, line drill rivet hole in outer cowl using a No. 30 drill bit.
NOTE : As each hole is drilled, install cleco fastener or rivet taped in place to maintain hole alignment.
2 Using an alternating (forward to aft rivet circles) criss-cross (clockwise to counterclockwise) pattern, drill the remaining 51 rivet holes in the outer cowl.
(b)Remove cleco fasteners or rivets as applicable and remove wear plate from outer cowl.

(10)Use a 98° - 102° countersink tool, countersink the inside surface of the (52) holes in the outer cowl only. Countersink depth to be controlled using a 100° Flush Shear Head rivet (NAS1200M4-4) as an aid. Rivet head must be flush to 0.005 in. (0.13 mm) below surface.

(11)Remove the burrs from outer cowl rivet holes (52) and wear plate rivet holes (52).

WARNING : CLEANING SOLVENTS ARE HIGHLY FLAMMABLE, VOLATILE AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH SKIN. OBSERVE PRECAUTIONS AGAINST FIRE.

(12)Clean the outer cowl and wear plate to remove marking ink with Aceton (C04-003) or Methyl-Ethyl-Ketone (C04-001).

(13)Install the wear plate on outer barrel.

(a)Position wear plate matching rivet holes and lightly "C" clamp in place.
(b)Insert from the inside, but do not form, a minimum of (10) equally spaced rivets (NAS1200M4-4) in each row (20 rivets total) to insure alignment. When alignment is assured, it is recommended that the remaining rivets (32) be installed, but not pulled. Rivets must be taped in place to maintain installation during riveting.
(c)Tighten "C" clamps and verify that wear plate is in uniform contact with outer cowl skin. Adjust or add clamps to achieve uniform contact.
(d)Dividing each rivet row into (4) equal spans, form rivets progressively in a span to span pattern alternating between forward and aft rivet rows.

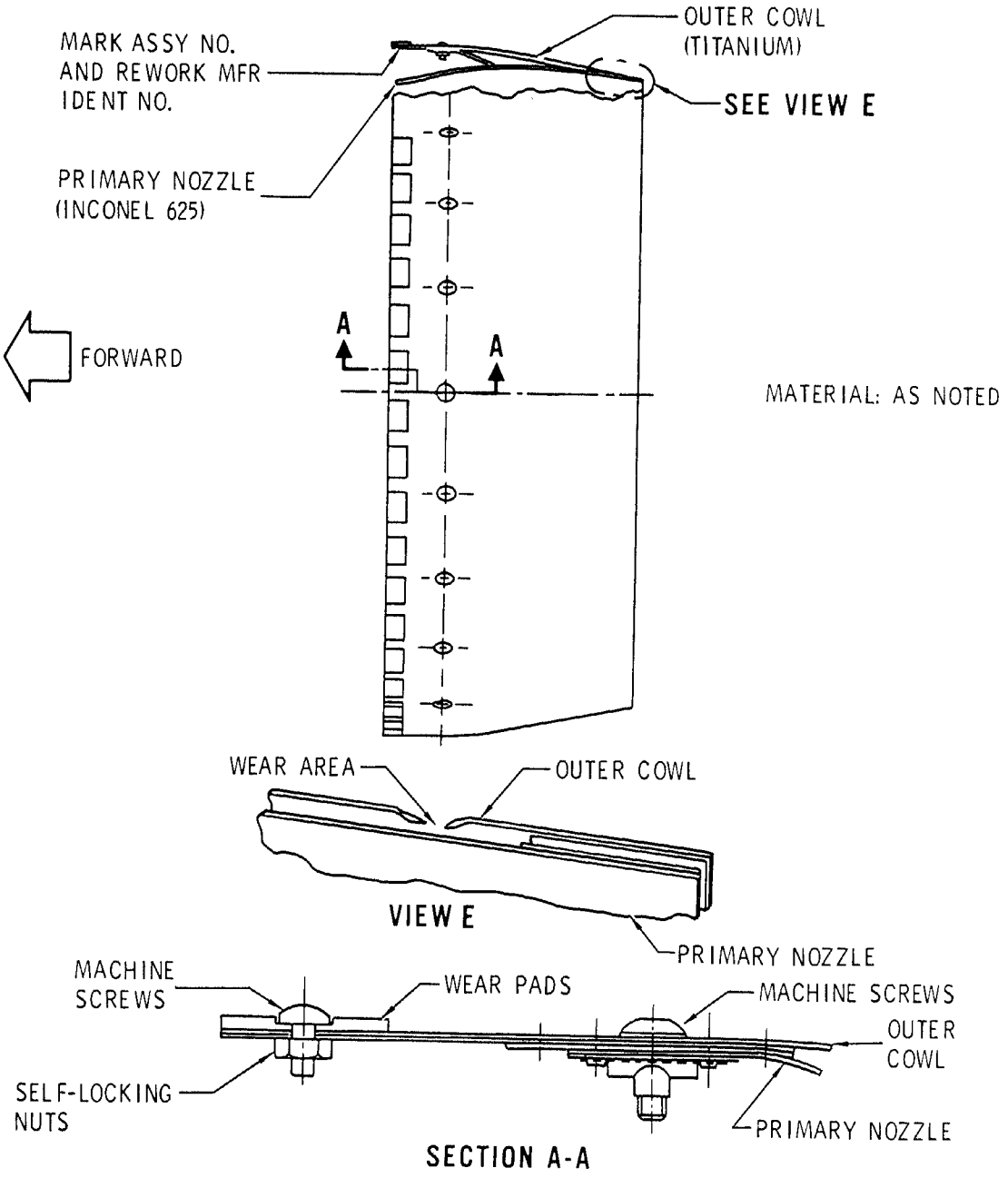
(14)Rivet the wear plate to outer barrel.

D. Repair of the Inner Primary Nozzle

(1)Reform any material to its original condition.
(2)Clean damaged area with stainless wire brush or 280-grit silicon carbine paper and wipe with cloth moistened with methyl-ethyl-ketone (C04-001) or acetone (C04-003). Wipe dry with clean lint free cloth.
(3)Drill a 0.0625 in. (1.587 mm) diameter hole at ends of cracks.
(4)Pin out length of crack to 0.040 to 0.060 in. (1.01 to 1.52 mm) wide.
(5)Visually inspect for complete removal of hairline cracks.
(6)Wipe area with cloth moistened with methyl-ethyl-ketone (C04-001) or acetone (C04-003). Wipe dry with clean lint free cloth.
(7)Weld crack (Ref. 70-00-00, P. Block 201).
Weld crack in 0.50 in. (12.7 mm) segments allowing two minutes between segments for skin to cool. Fill all stop-drill holes and crack with AMS 5837 filler metal. Use inert-gas shielded-tungsten-arc with argon backup.
CAUTION : DO NOT GRIND PARENT METAL OF SKIN.
(8)Grind completed weld within 0.010 in. (0.254 mm) of skin. Surface finish to 125 microinches or finer.
(9)Etch outside of weld (Ref. 70-00-00, P. Block 201) (Class D or G).
(10)Spot FPI (Ref. 70-00-00, P. Block 201) (Class D).
No cracks permitted.
(11)Do an inspection of all other indications (Ref. 70-00-00, P. Block 201) (Class B).

E. Close-Up

(1)Install primary nozzle assembly (Ref. 78-11-01, P. Block 401).
(2)Close cowl doors, remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).



BM5 78 11 01 8 LAMO - 22 - 15
DM5

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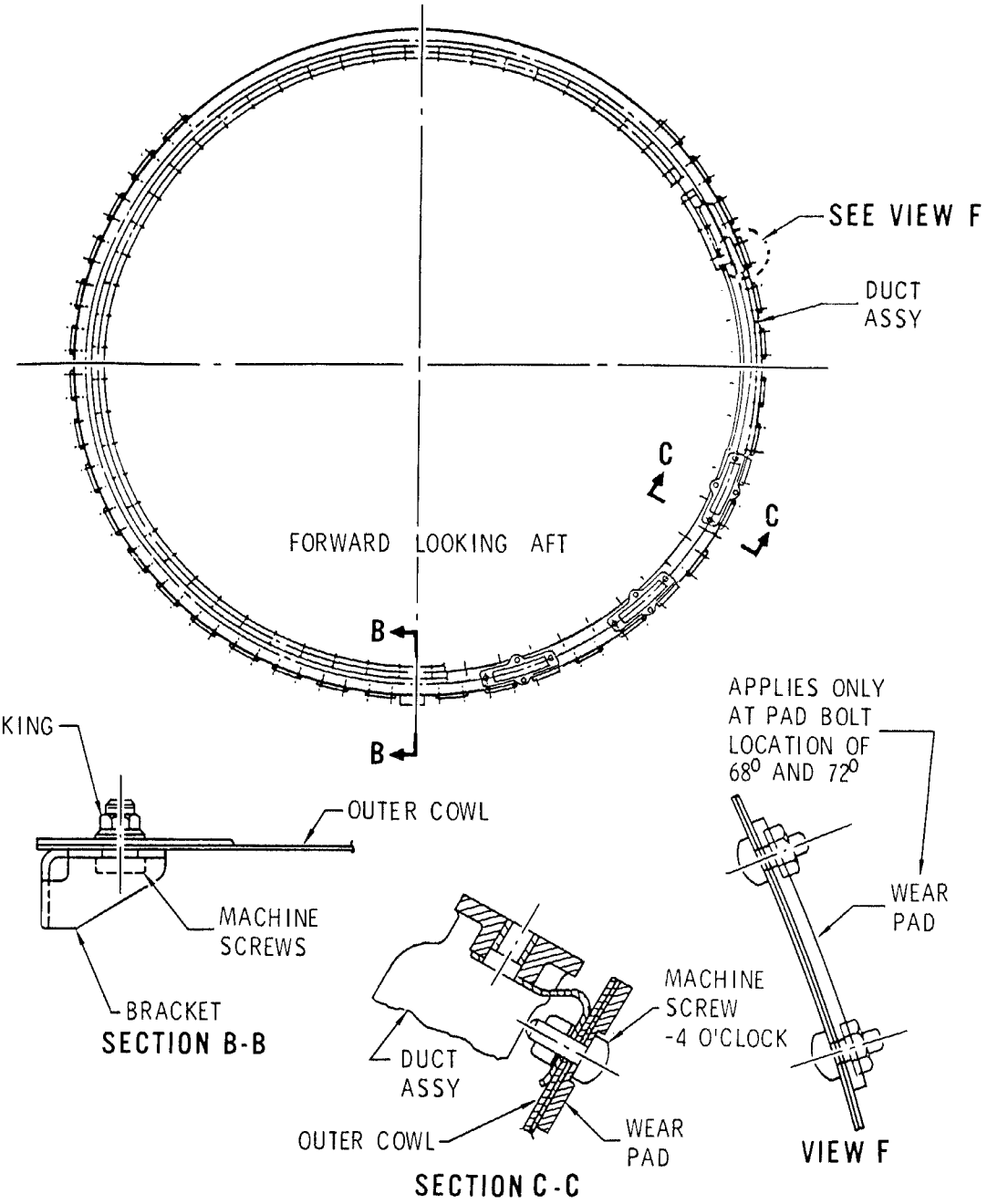
Nozzle Assembly Wear Pads
Figure 801



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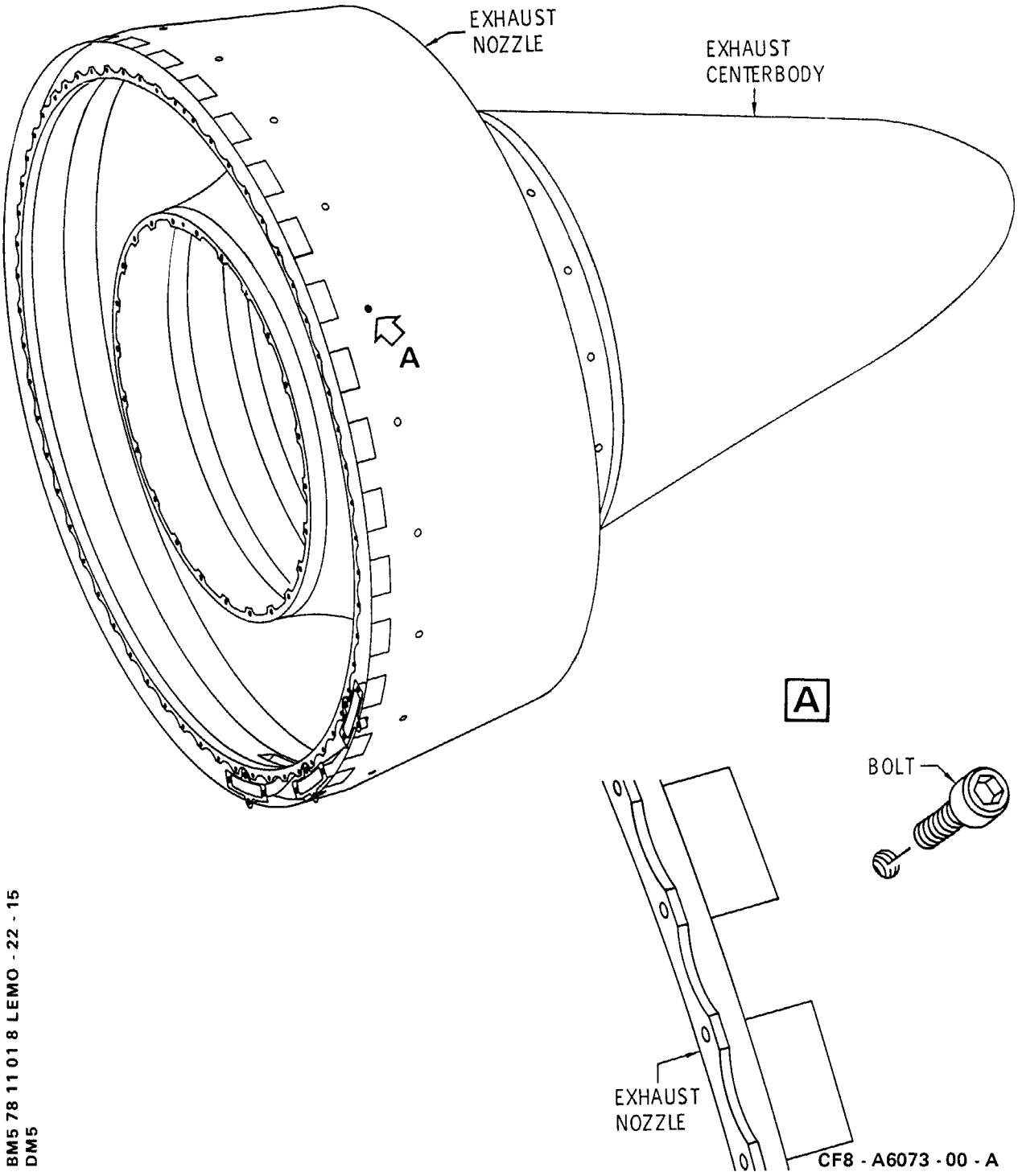
Nozzle Assembly
Figure 802



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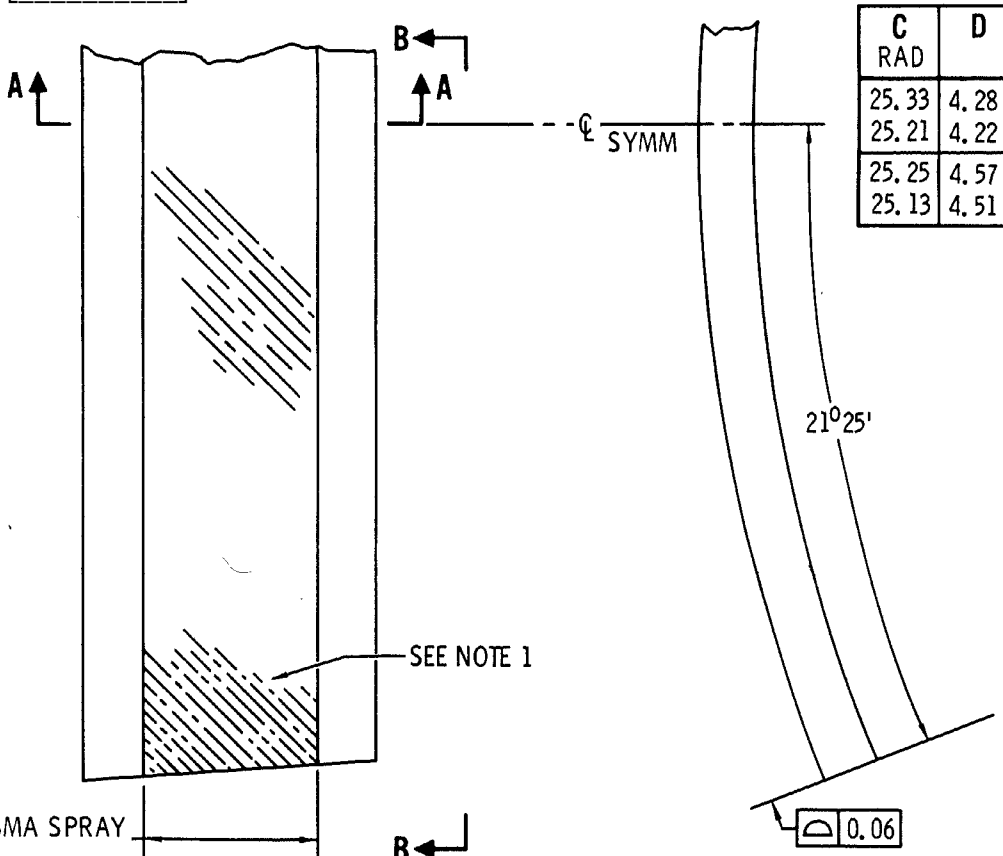
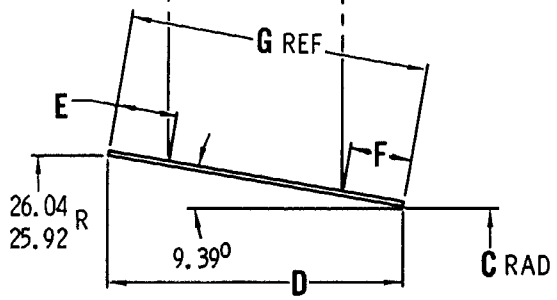
Nozzle Disassembly
Figure 803



C RAD	D	E	F	G REF
25.33 25.21	4.28 4.22	0.97 0.85	2.66 2.42	4.31
25.25 25.13	4.57 4.51	1.10 0.80	1.20 0.90	4.60



SECTION A-A

NOTE:

1. APPLY C07-007 TO PLASMA SPRAY AREA PER STANDARD PRACTICES 70-49-19 TO A THICKNESS OF 0.004-0.007 INCHES (0.1016-0.1778 MM). AREA TO BE GRIT BLASTED WITH ALUMINUM OXIDE PRIOR TO COATING TO A SURFACE FINISH OF 90 TO 120 RMS.
2. TOTAL LENGTH OF WEAR STRIP IS 19.155 INCHES (486.53 MM).

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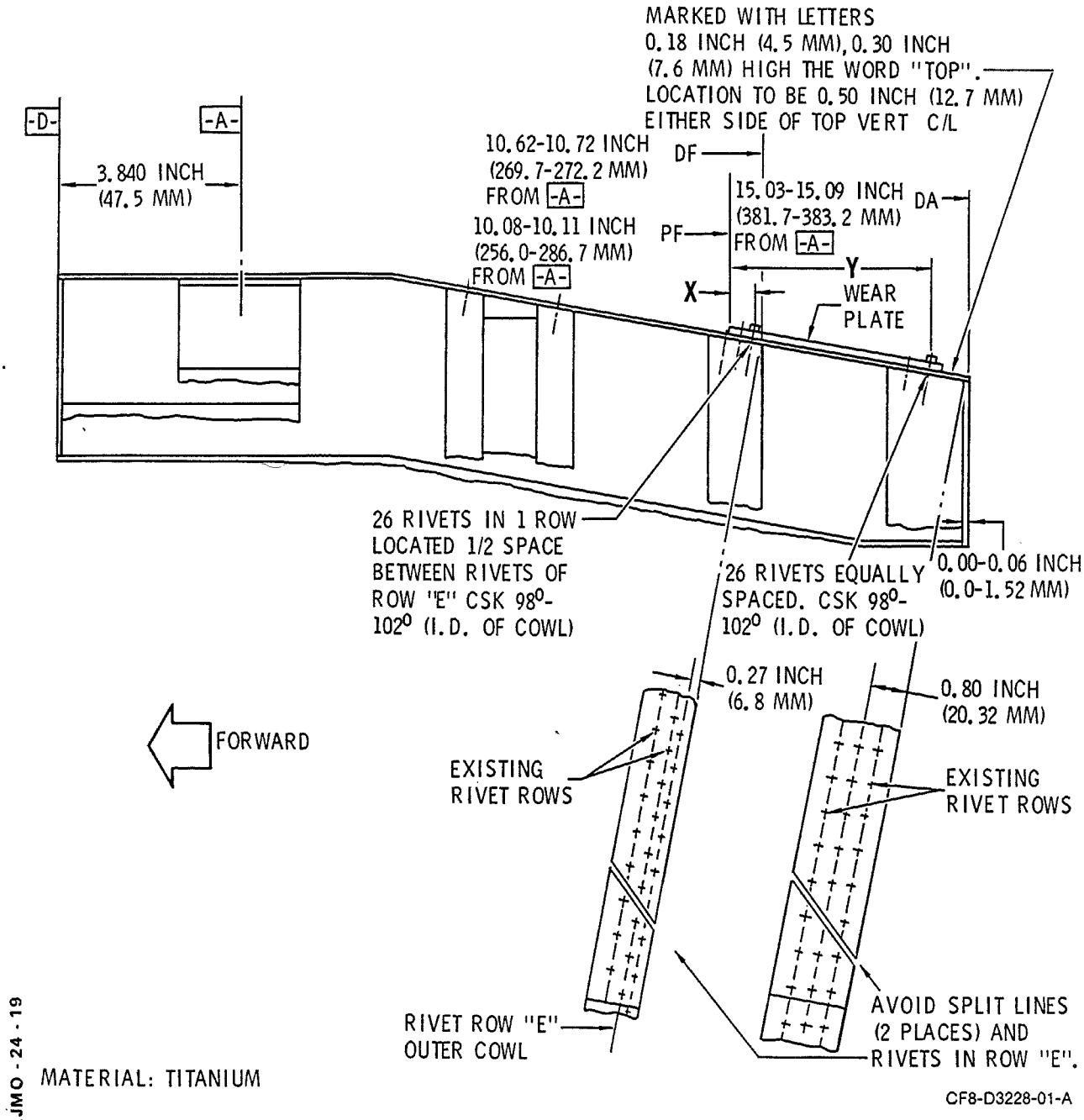
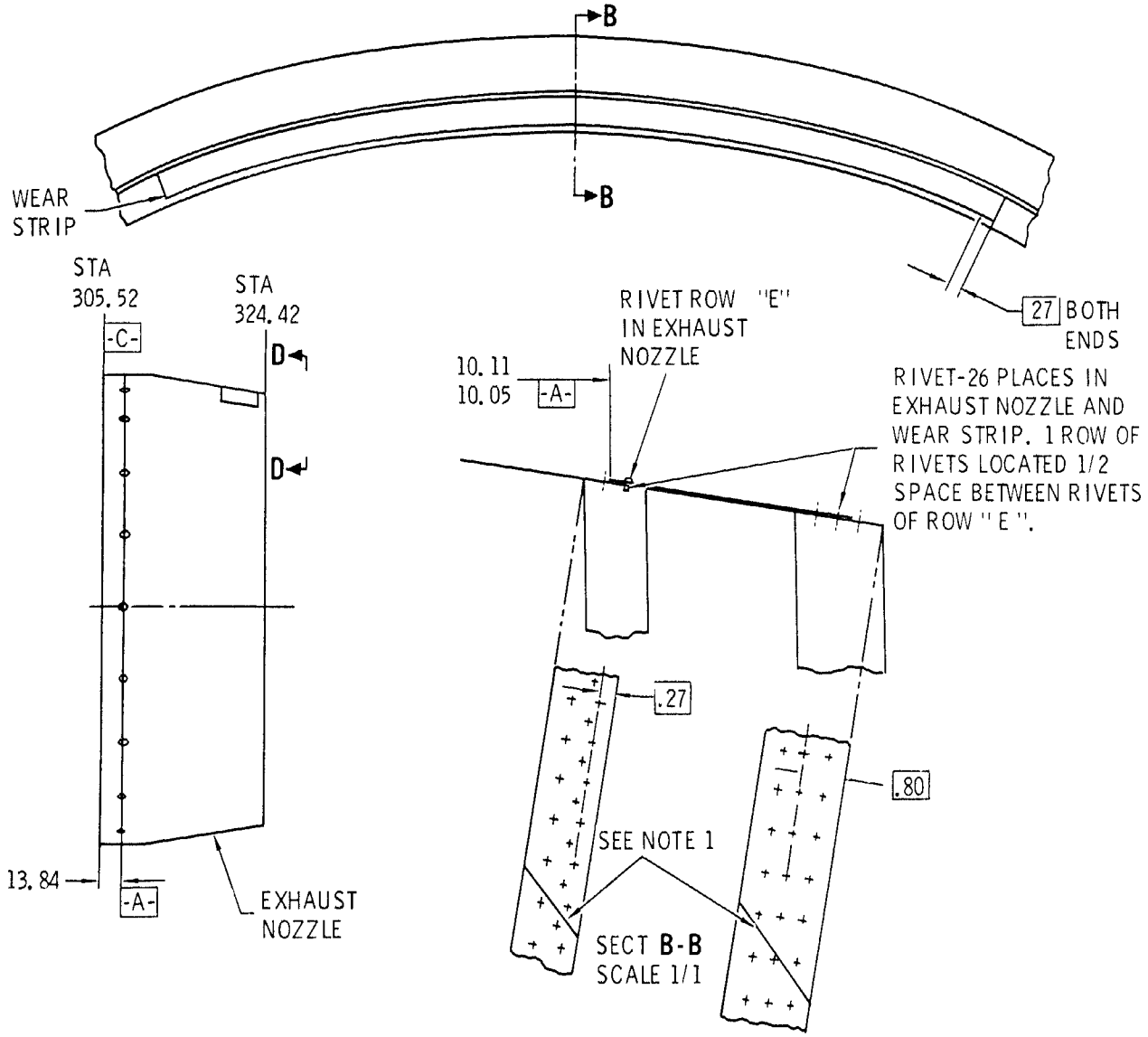
Wear Strip Fabrication
Figure 804



MATERIAL: TITANIUM

BM5 78 11 01 8 LJMO - 24 - 19
DM5

Wear Strip Layout
Figure 805



NOTE:

1. GAPS IN EXISTING DOUBLERS ON ITEM 2 MAY BE PRESENT AT ITEM 4 LOCATIONS. AT THESE LOCATIONS, POSITION ITEM 4 RIVETS AS FOLLOWS:
   - A). 18- .00 FROM THE CIRCUMFERENTIAL EDGE OF ITEM 3.
   - B). 19 MIN DISTANCE FROM ITEM 2 DOUBLERS.
   - C). 30 MIN FROM EXISTING ITEM 2 RIVETS (NOW 2).

BM5 78 11 01 8 LLMA - 22 - 15
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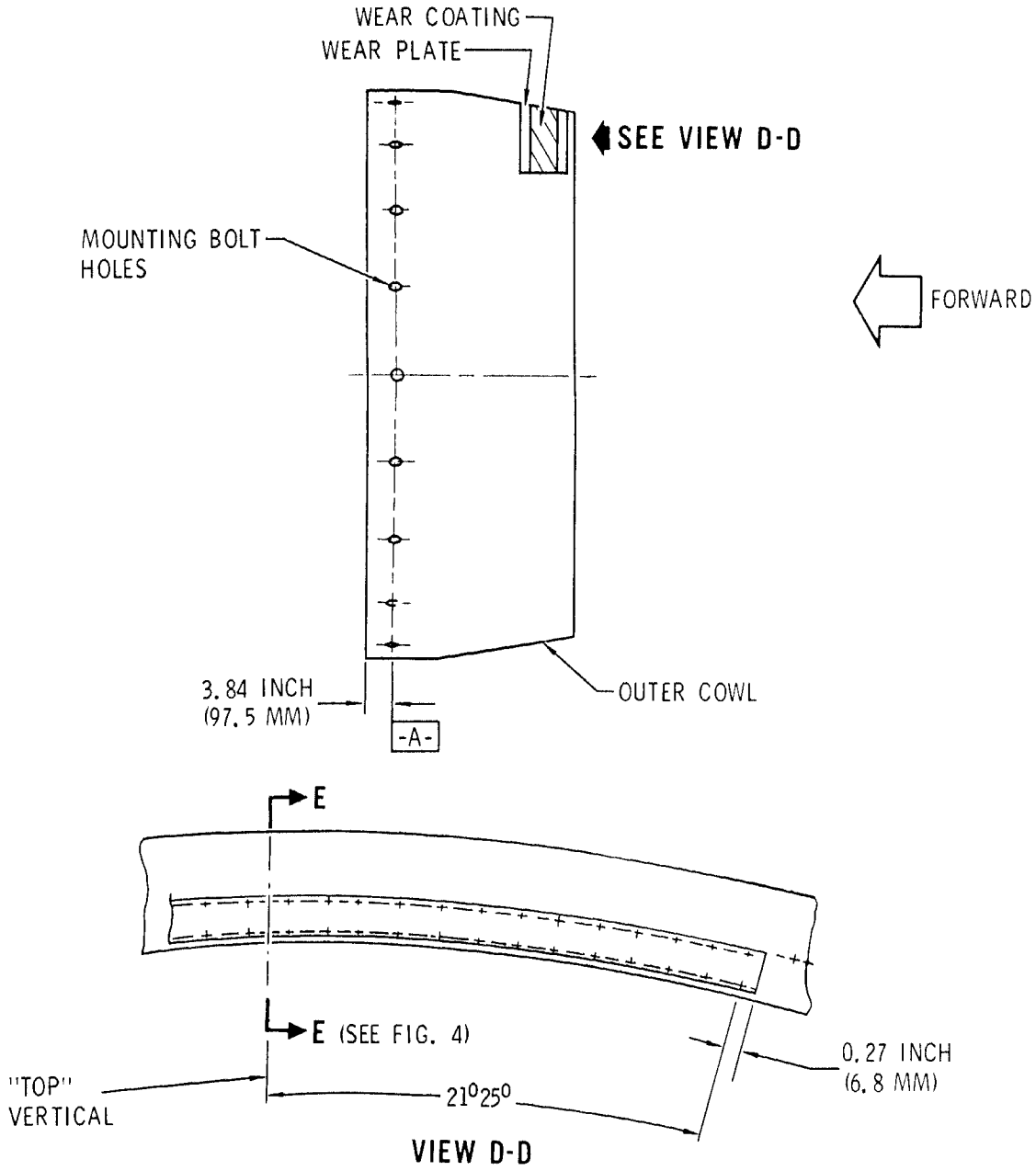
Wear Strip Installation (Sheet 1/2)
Figure 806



MATERIAL: TITANIUM

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Wear Strip Installation (Sheet 2/2)
Figure 806

ENGINE EXHAUST PLUG - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A. RSE1078	Exhaust Plug Removal Fixture
B. RSE1081	Exhaust Plug Dolly
C.	Circuit Breaker Safety Clips
D.	Access Platform
E. Material No.C02-020	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

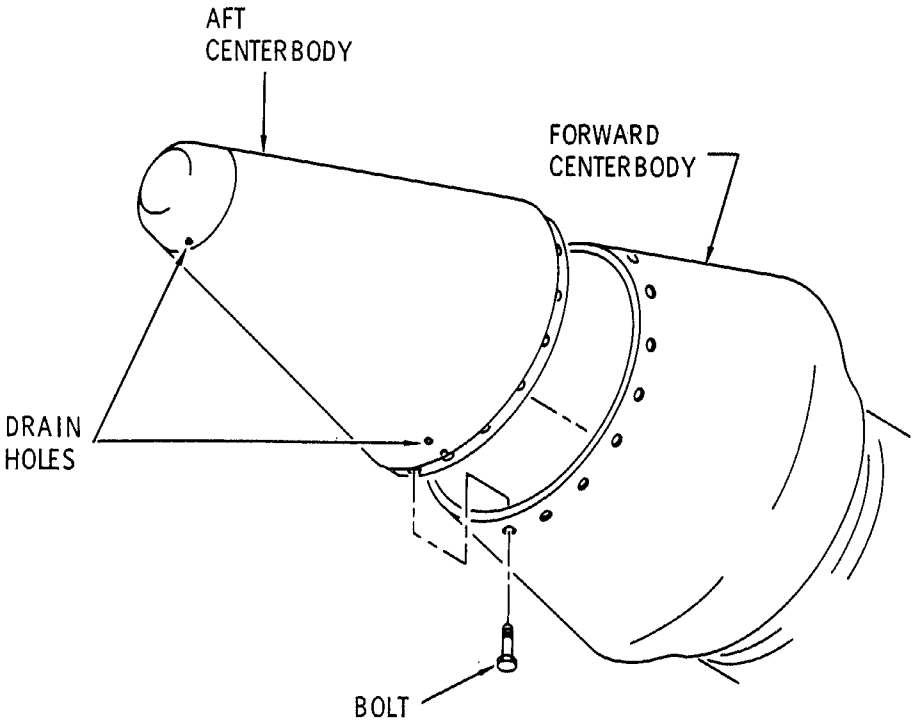
2. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open core cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.

B. Removal (Ref. Fig. 401, 402)
(1)Remove bolts securing aft centerbody to forward centerbody and remove aft centerbody
(2)Place aft centerbody on primary exhaust dolly, RSE1081.
(3)Position collapsed exhaust plug removal fixture, RSE1078, beneath barrel, open fixture and engage sliding collars, locking fixture in open position.
(4)Remove bolts securing forward centerbody to engine flange and remove forward centerbody.
(5)Place forward centerbody on dolly and remove plug removal fixture.

C. Installation (Ref. Fig. 402)
(1)Position open removal fixture RSE1078 beneath barrel, remove forward centerbody from dolly, RSE1081, and support on removal fixture.
(2)Coat bolt threads with anti-seize lubricant C02-020.
(3)Position forward centerbody on engine flange, align index pin with alignment hole near top of engine flange, attach forward centerbody to flange with bolts.TORQUE bolts, in an alternating sequence, to between 100 and 140 lbf. in. (1.15 and 1.61 m. daN.). Collapse and remove plug removal fixture.
(4)Remove aft centerbody from dolly. Put on the forward centerbody with the word "TOP" at 12 O'clock and a bolt hole and drain hole at bottom centerline. Install bolts. Hold upward pressure on aft centerbody to ensure uniform gap between aft centerbody and forward centerbody. TORQUE bolts in an alternating sequence to between 50 and 70 lbf. in. (0.56 and 0.79 m. daN.).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and



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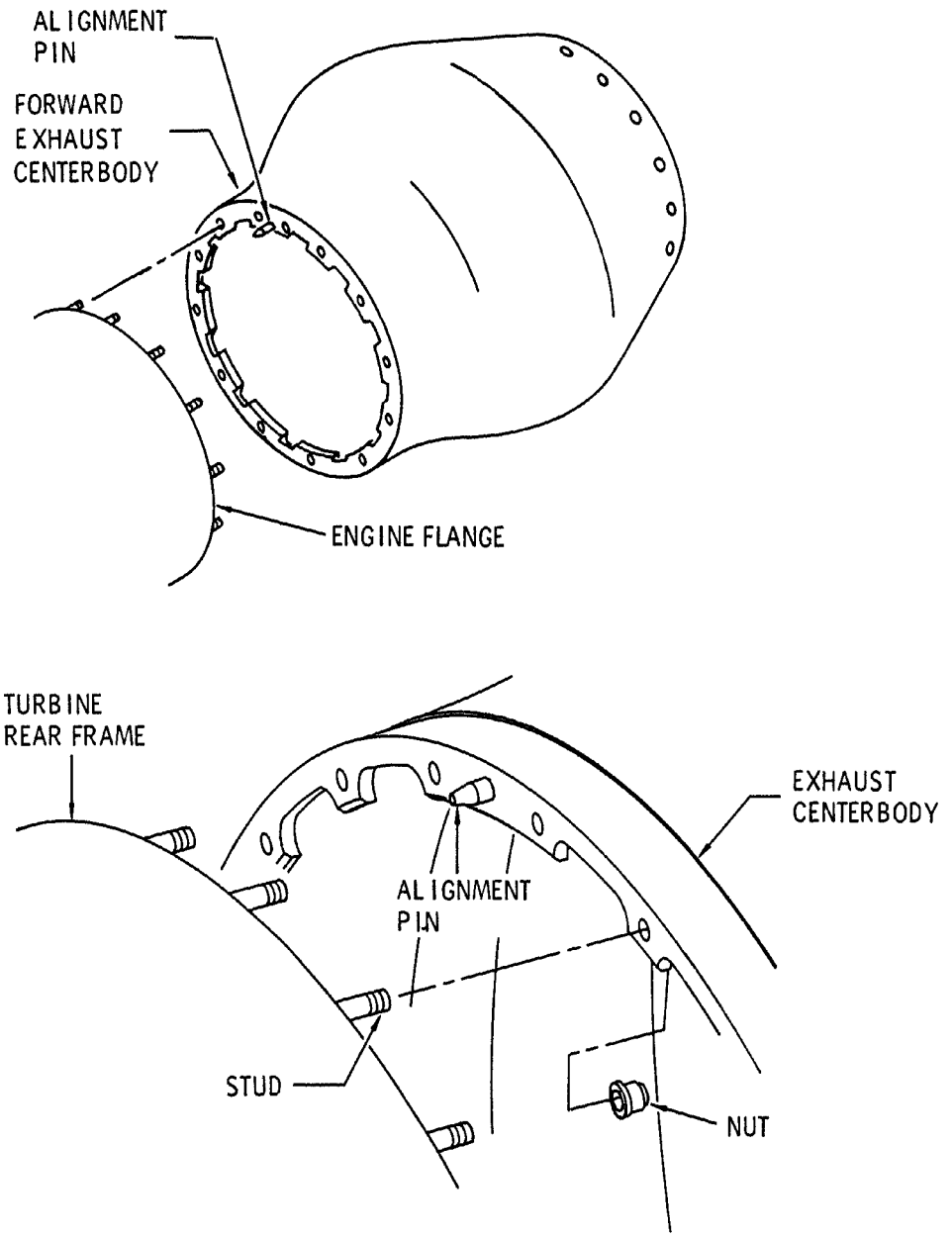
Engine Exhaust Plug
Figure 401



BM5 78 11 02 4 LCMO - 16 - 12
DM5

Forward Exhaust Centerbody
Figure 402

miscellaneous items of equipment.

(2)Remove access platform.

(3)Close core cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

ENGINE EXHAUST PLUG - INSPECTION/CHECK

1. General

This procedure pertains to the inspection and checks of the exhaust nozzle centerbody.

2. Equipment and Materials

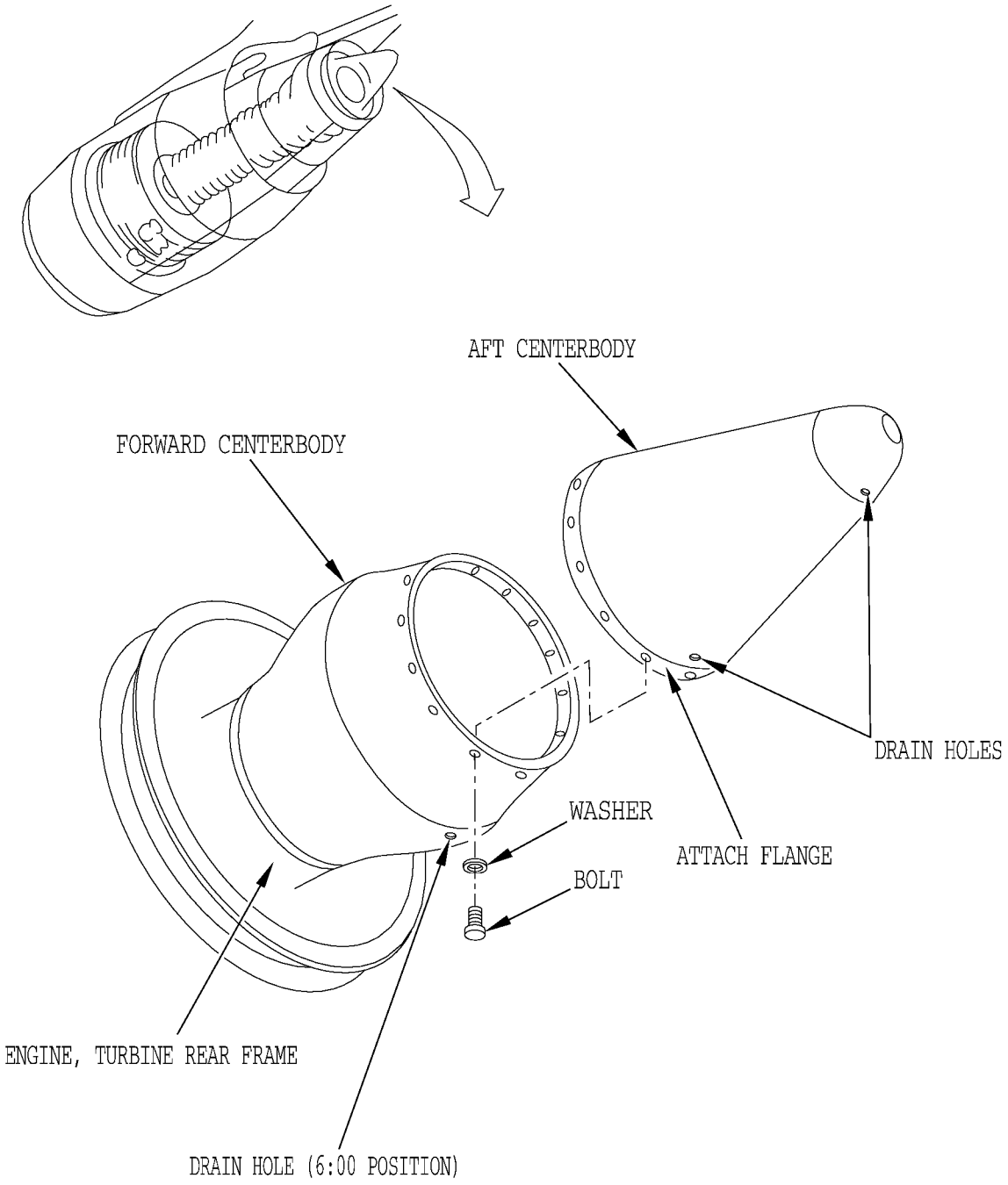
ITEM	DESIGNATION
Referenced Procedure	
- 78-11-02, P. Block 401	Engine Exhaust Plug
- 78-11-02, P. Block 801	Engine Exhaust Plug

R 3. Procedure - Exhaust Nozzle Centerbody Assembly - Inspection/Check

R A. Visual Inspection/Check (Ref. Fig. 601, 602, 603)
R (Ref. Fig. 604)

Inspect/Check	Maximum Serviceable Limits	Remarks
A. Aft centerbody for :		
(1) Damaged or missing nut plates on forward flange	Not serviceable	Replace nut plates
(2) Cracked or missing rivets	Not serviceable	Replace rivets
(3) Cracks in forward attach flange	Not serviceable	Replace centerbody (Ref. 78-11-02, P. Block 401)
R (4) Cracks in sheet metal (skin) from forward flange to 25 in. (635 mm) aft	Cracks not greater than 1.0 in. (25.4 mm) in length and total accumulation not greater than 3.0 in. (76.2 mm) and cracks must be at a distance of more than 3.0 in. (76.2 mm). Cracks do not extend into the flange.	Repair cracks (Ref. 78-11-02, P. Block 801).
R (5) Cracks in sheet metal panel (skin) 25 in. (635 mm) aft of forward flange to end of aft centerbody	Cracks not greater than 1.0 in. (25.4 mm) in length and, with a total accumulation not greater than 3.0	Repair cracks (Ref. 78-11-02, P. Block 801).

Inspect/Check	Maximum Serviceable Limits	Remarks
	in. (76.2 mm) and, cracks must be at a distance of more than 3.0 in. (76.2 mm).	
(6) Clogged or closed drain holes	Not serviceable.	Open drain holes.
B. Forward Centerbody for :		
(1) Cracks in mounting flange	Cracks not greater than 0.1 in. (2.5 mm) in length and total accumulation not greater than 2.0 in. (50.8 mm) and cracks must be at a distance of more than 1.0 in. (25.4 mm).	Repair cracks (Ref. 78-11-02, P. Block 801).
(2) Missing alignment pin	Not serviceable	Replace alignment pin
(3) Cracks in sheet metal panel (skin) outside of forward attach flange	Cracks not greater than 1.0 in. (25.4 mm) in length and total accumulation not greater than 6.0 in. (152 mm) and cracks must be at a distance of more than 2.0 in. (50.8 mm). Cracks do not extend into the flange.	Repair cracks (Ref. 78-11-02, P. Block 801).
C. Dents in forward or aft centerbody	Depth not greater than 0.25 in. (6.35 mm)	Reform to smooth contour



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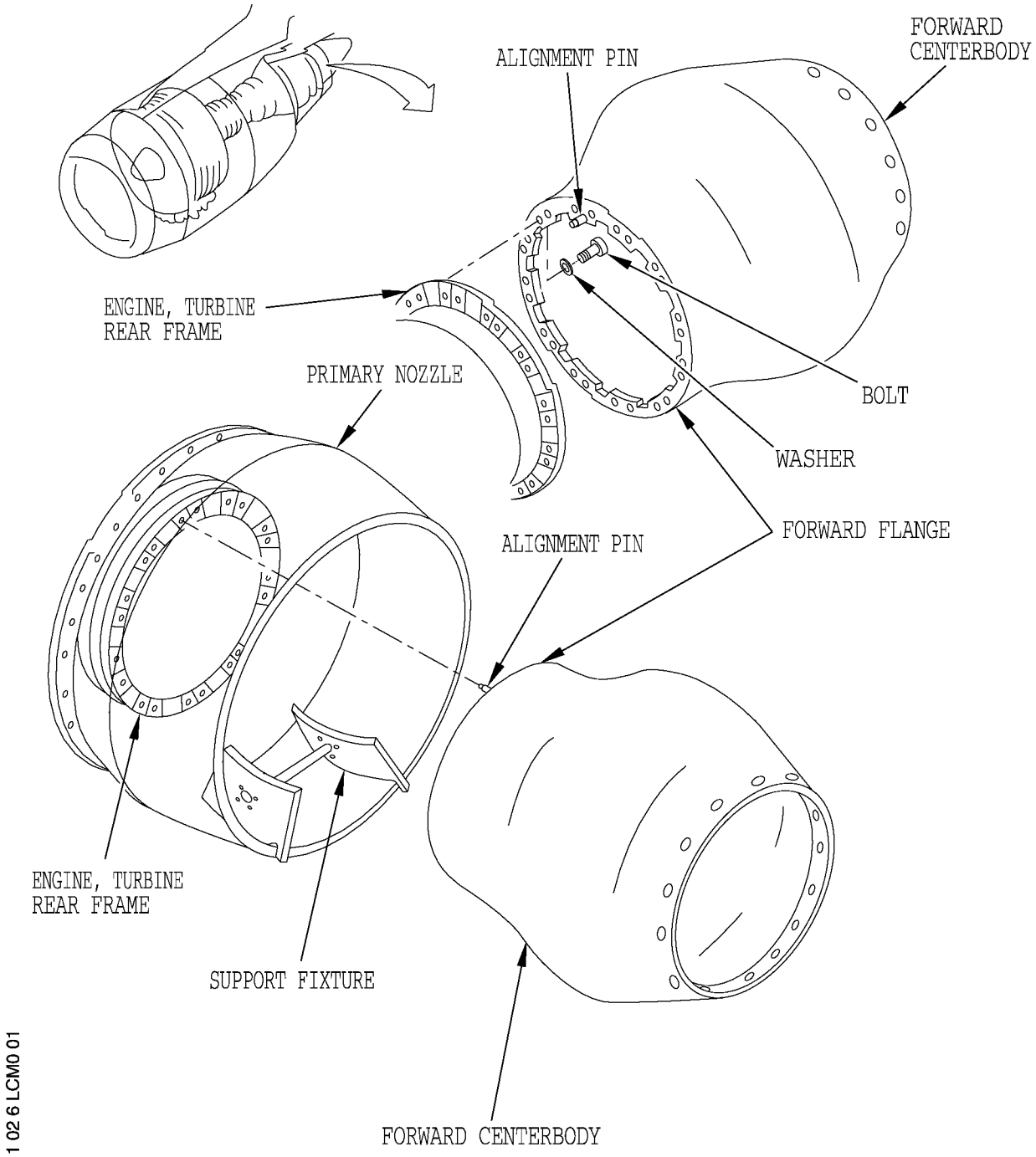
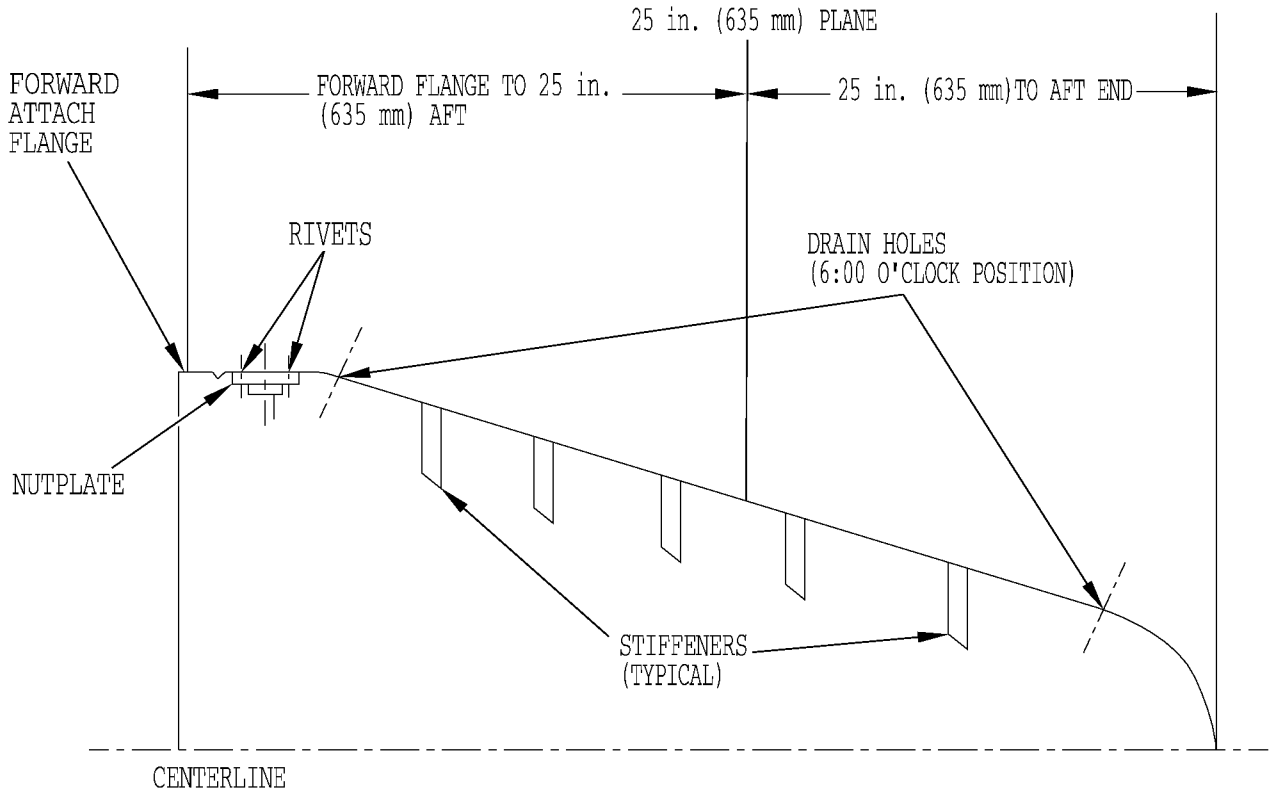
Forward and Aft Centerbody Assembly View
Figure 601

R



Forward Centerbody Orientation View
Figure 602

R



AFT CENTERBODY

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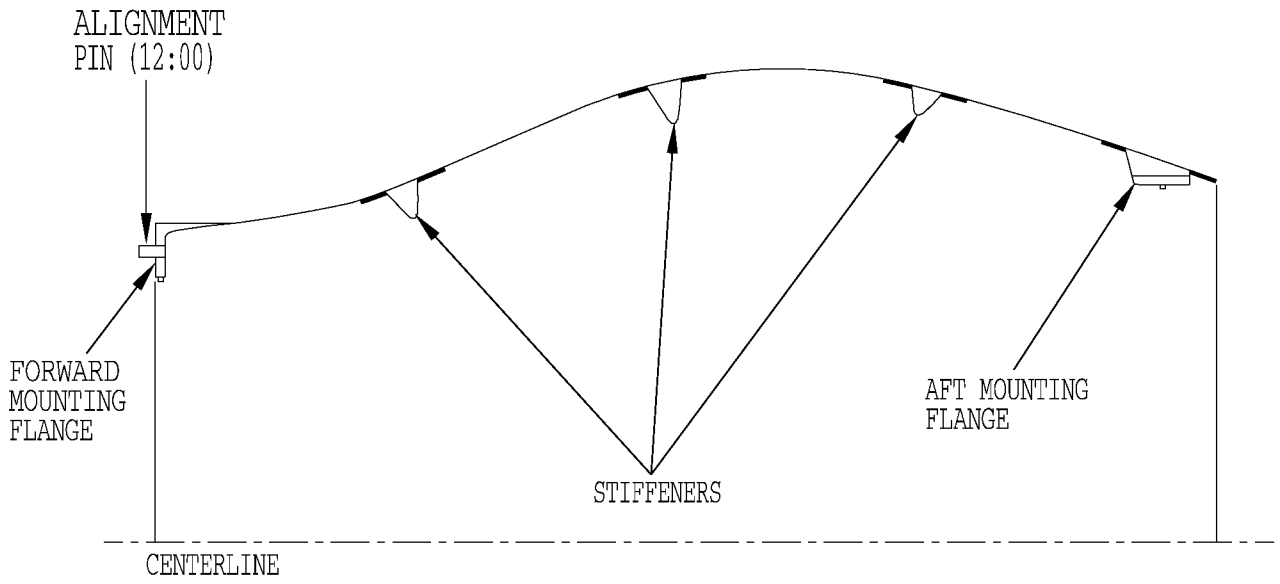
Aft Centerbody Orientation View
Figure 603



FORWARD CENTERBODY

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Forward Centerbody Orientation View
Figure 604

R

ENGINE EXHAUST PLUG - APPROVED REPAIRS

1. General
This repair provides instructions for the repair of the Forward and AFT Centerbodies.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
B. Material No.C04-003	Cleaning Compounds and Solvents (Ref. 70-00-00)

3. Procedure

A. Reform any material to its original condition.

B. Clean damaged area with stainless wire brush or 280-grit silicon carbine paper and wipe with cloth moistened with methyl-ethyl-ketone (C04-001) or acetone (C04-003). Wipe dry with clean lint free cloth.

C. Drill a 0.0625 in. (1.587 mm) diameter hole at ends of cracks.

D. Pin out length of crack to 0.040 to 0.060 in. (1.01 to 1.52 mm) wide.

E. Visually inspect for complete removal of hairline cracks.

F. Wipe area with cloth moistened with methyl-ethyl-ketone (C04-001) or acetone (C04-003). Wipe dry with clean lint free cloth.

G. Weld crack per Engine Standard Practices Manual, chapter 70-41-00. Weld crack in 0.50 in. (12.7 mm) segments allowing two minutes between segments for skin to cool. Fill all stop-drill holes and crack with AMS 5837 filler metal. Use inert-gas-shielded-tungsten-arc with argon backup.
CAUTION : DO NOT GRIND PARENT METAL OF SKIN.

H. Grind completed weld within 0.010 in. (0.254 mm) of skin. Surface finish to 125×10^{-6} in. or finer.

I. Etch outside of weld per Engine Standard Practices Manual, chapter 70-24-01, class D or G.

J. Spot FPI per Engine Standard Practices Manual, chapter 70-32-03, class D. No cracks permitted.

K. Interpret all other indications per Engine Standard Practices Manual, chapter 70-31-01, class B.

L. Stress relieve as follows :
(1)Heat to 1775°F +/- 25°F (968.3°C +/- 3.8°C).
(2)Cool down either in the oven or at room temperature.
NOTE : No time requirement required at temperature.

**ON A/C 001-100,

R

THRUST REVERSER - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001, 002)

The thrust reverser system is used to deflect and redirect part of the engine exhaust flow to obtain a reverse thrust component. This system is controlled from the flight compartment by a thrust reverser control lever hinged to the throttle control lever.

The thrust reverser is composed of a left and a right hand assembly which provide the fan nozzle for forward thrust operation and components which are translated and rotated into position for redirecting fan flow during reverse thrust operation.

Each fan reverser assembly is operated by a single pneumatic motor/actuator, powered by compressor discharge bleed air.

The motor/actuator drives ball screw actuators through flexible shafts and gearboxes to translate and rotate reverser components to the desired position. Secondary air power sources are provided in airframe installation.

Appropriate interlocks and position microswitches are incorporated in the system ; caution lights in the flight compartment indicate thrust reverser position.

The fan reverser system on one engine is completely independent of the system on the other engine.

Means are provided for securing an inoperative reverser in the stowed position to permit the aircraft dispatch with the reverser de-activated.

The fan reverser can be held in the deployed position with the engine at full thrust for a maximum of 30 seconds.

**ON A/C 001-100,

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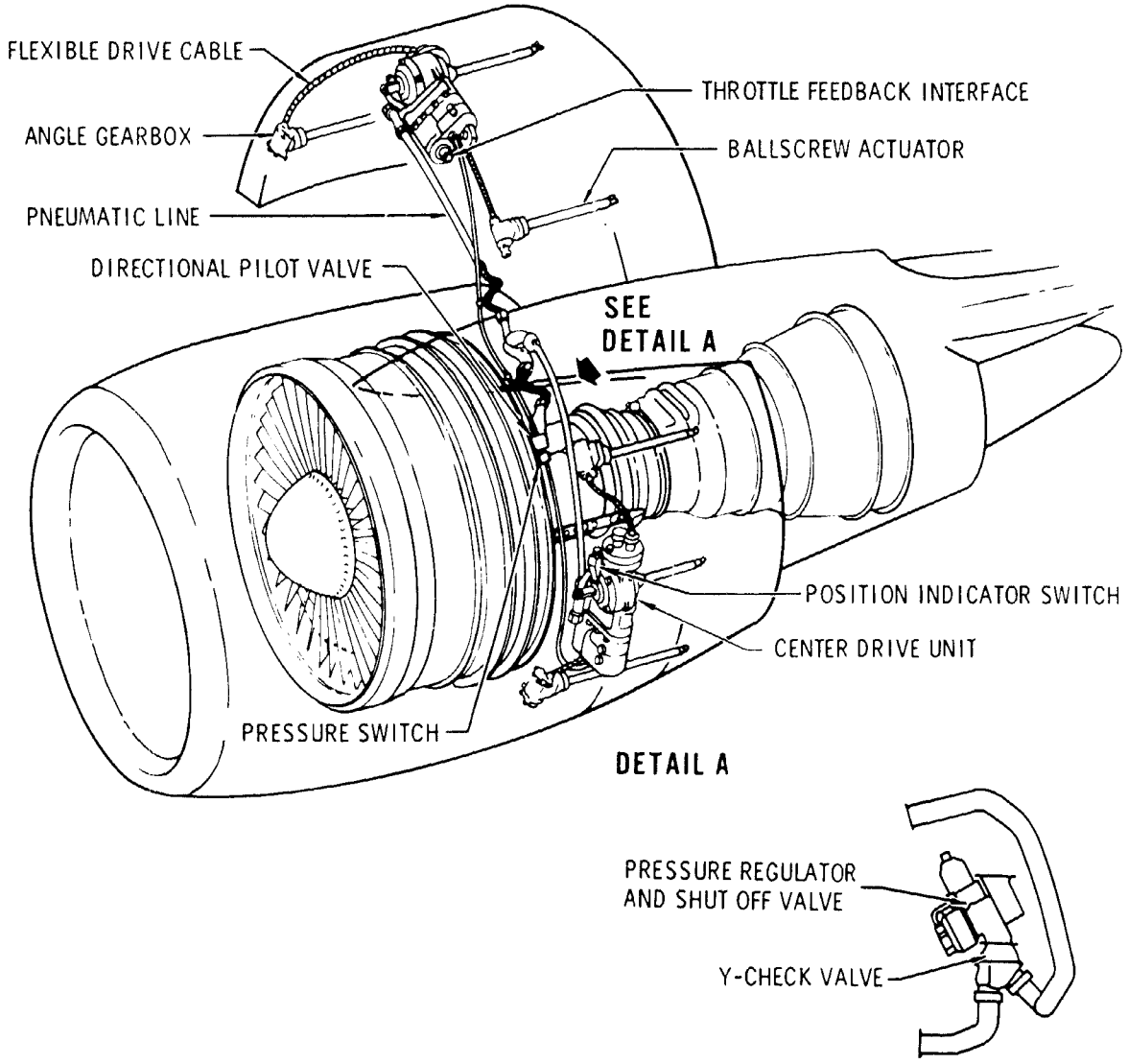

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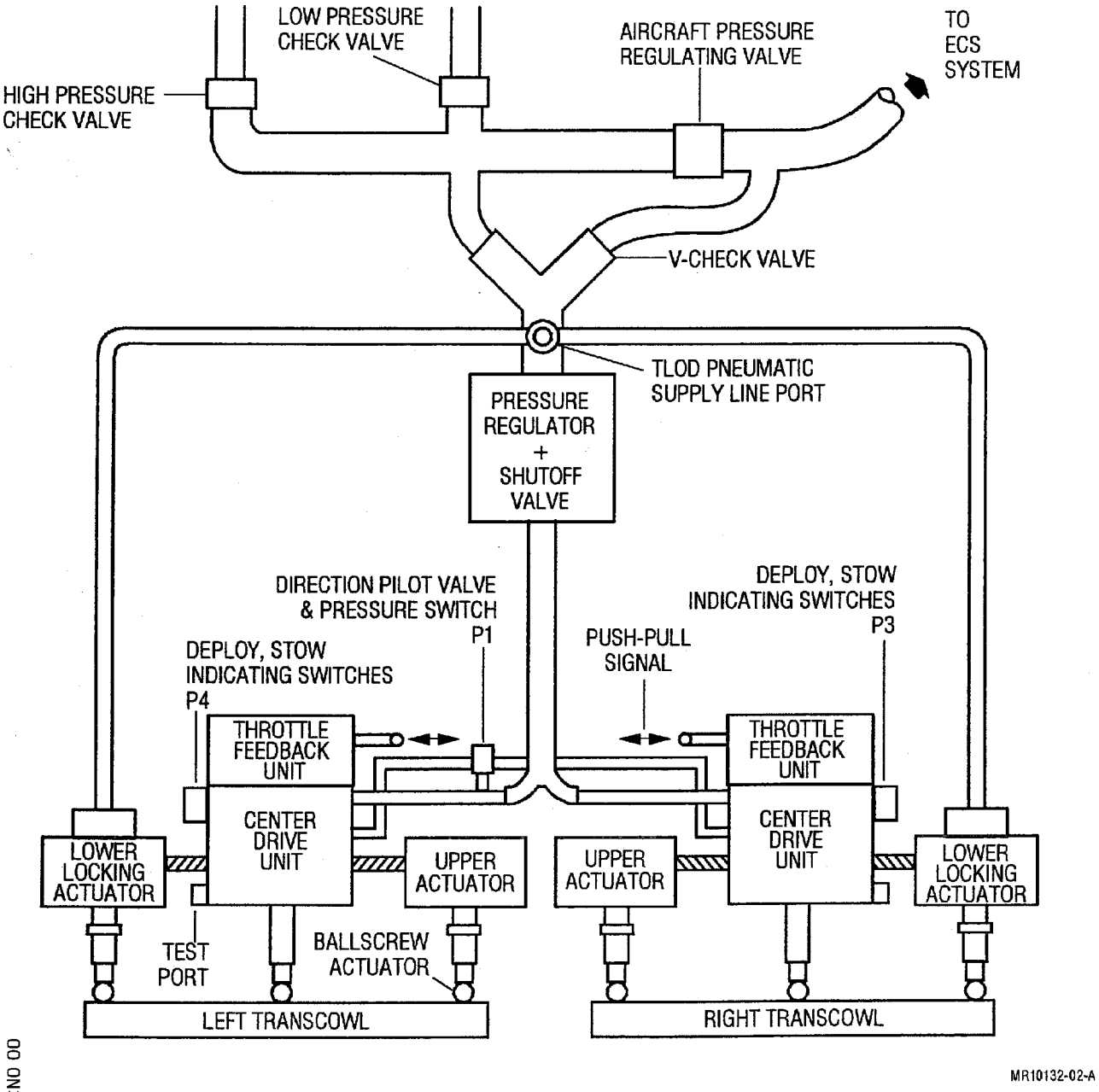
Thrust Reverser System
Figure 001



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Thrust Reverser Actuation System Schematic
With Locking Actuator Assembly
Figure 002

2. Description

The thrust reverser actuation system includes :
- a mechanical control system
- a pneumatic supply system
- pneumatic drive motors/actuators
- a pressure regulating and shut off valve
- a directional pilot valve
- a feedback system
- electrical and pressure switches
- an indicating system

A. Pneumatic Supply Manifold

The pneumatic energy required for driving the two pneumatic actuator drive motors/actuators is bled from the engine compressor or the other aircraft pneumatic system.
A ground check out port to actuate the reverser system during a ground test is located on each drive motor/actuator for back-up, if ECS air is not available.

B. Y Check Valve (Ref. Fig. 003)

The Y check valve allows either ECS or engine bleed airflow into the reverser system while preventing airflow back to the alternate inlet source.
It is installed on the compressor case, directly attached to the pressure regulator and shut off valve in the reverser air supply duct.
A TLOD pneumatic supply port is installed on the trhust reverser side of the Y-Check Valve and supplies ECS or engine bleed air to the locking actuator gearbox assemblies.

C. Pressure Regulating and Shut Off Valve (Ref. Fig. 004)

This is a pneumatically actuated, spring loaded closed, solenoid controlled, poppet-type pressure regulating and shut off valve.
The Y check valve has a pneumatic supply port that supplies ECS or bleed air to the locking actuator gearbox assemblies (Ref. Fig. 002).

D. Directional Pilot Valve (DPV) (Ref. Fig. 005)

The directional pilot valve (DPV) supplies the signal to the pneumatic drive motor/actuator which commands the stow or deploy mode. It is located on the LH thrust reverser looking aft (11 o'clock) below the pylon area above the Y duct.

**ON A/C 001-100,

R

E. Pneumatic Drive Motor/Actuator (Ref. Fig. 008)

Each half of the reverser cowls is actuated at three points. The center point is actuated by the pneumatic drive motor/actuator. Two actuators are mounted at 3 and 9 o'clock on the reverser fixed structure and pinned at

the aft end to a clevis pocket of the translating cowl.
This pneumatic motor/actuator drives the angle gearbox, and contains a directional control valve, brake, reduction gears, ball screw, feedback mechanism and position indicating switches.

F. Locking Actuator Gearbox Assembly (Ref. Fig. 009)
The locking actuator gearbox assemblies (LAGA) are attached to the lower ballscrew of each fan reverser. The LAGA is a pneumatically actuated, electrically commanded, locking bar type lock. The piston is spring loaded closed and provides an additional level of redundancy against inadvertent deployment of the thrust reverser actuator system. With normal supply air pressure applied and the solenoid deenergized, the rotating shaft is locked. When the solenoid is energized, the piston strokes and the rotating shaft is released. The LAGA and the ballscrew together form the locking actuator assembly (LAA).

G. Ball Screw Actuator (Ref. Fig. 010)
There are six ballscrews for each thrust reverser system ; the ballscrews on the pneumatic drive motor/actuator on the center actuator are similar to those on the end actuators except for the diameter which is bigger to accommodate the internal feedback and stop rod.

H. Flexible Drive Cable (Ref. Fig. 011)
There are four flexible cables interconnecting the feedback actuators with the end angle gearbox one long and one short per side.

**ON A/C 001-100,

I. Electrical Harness (Ref. Fig. 006)

**ON A/C 001-100,

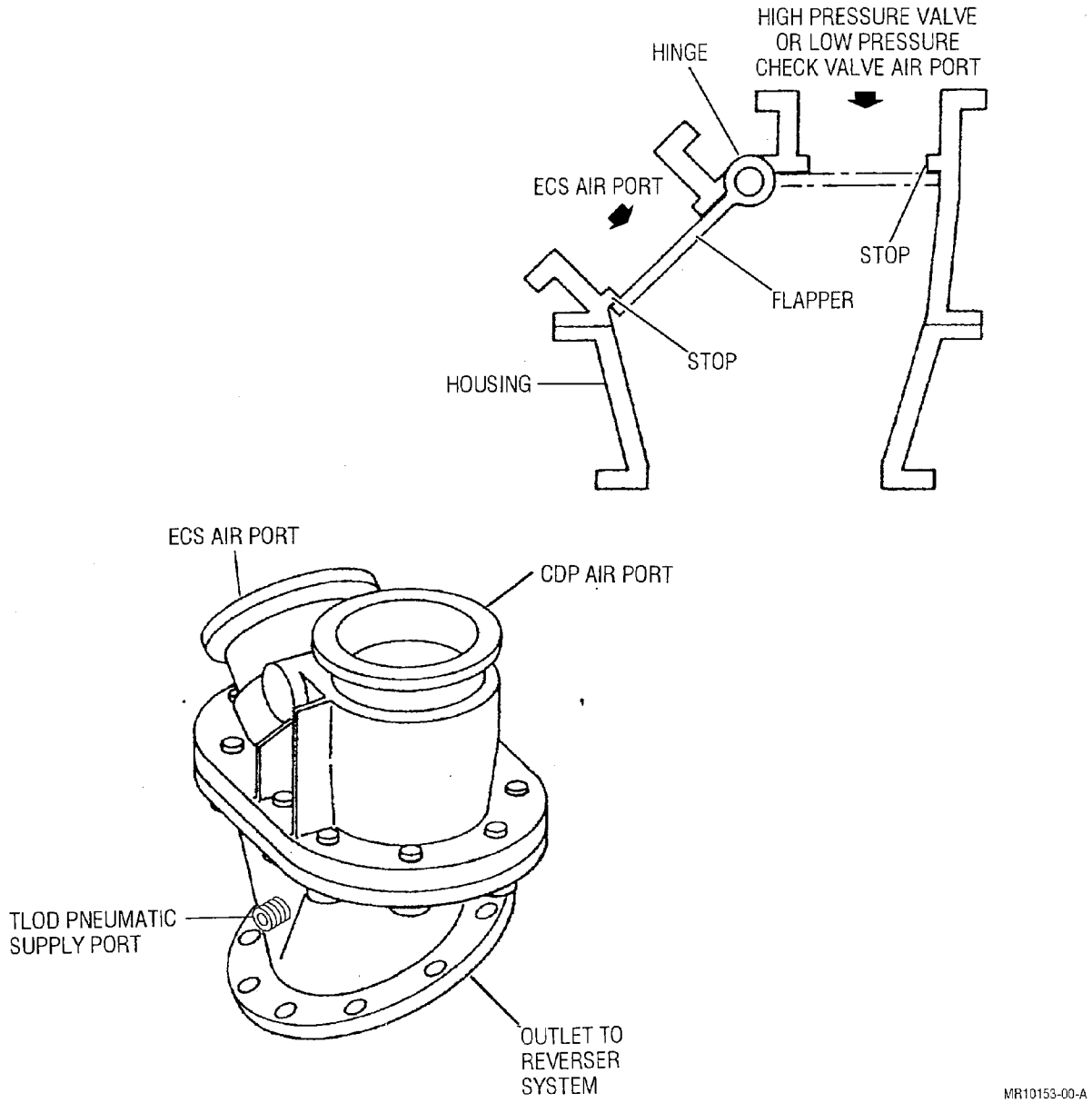
Post SB 78-2011 For A/C 001-100,

I. Electrical Harness (Ref. Fig. 007)

**ON A/C 001-100,

The wiring consists of two harnesses mounted on the reverser which supply the following components :
- Right harness : right actuator deploy/stow switches and nacelle temperature sensor
- Left harness : left actuator deploy/stow switches T/R pressure switch and DPV solenoid.
Each fan reverser mounted harness is connected to the aircraft harness thru a mobile socket contact.

**ON A/C 001-100,



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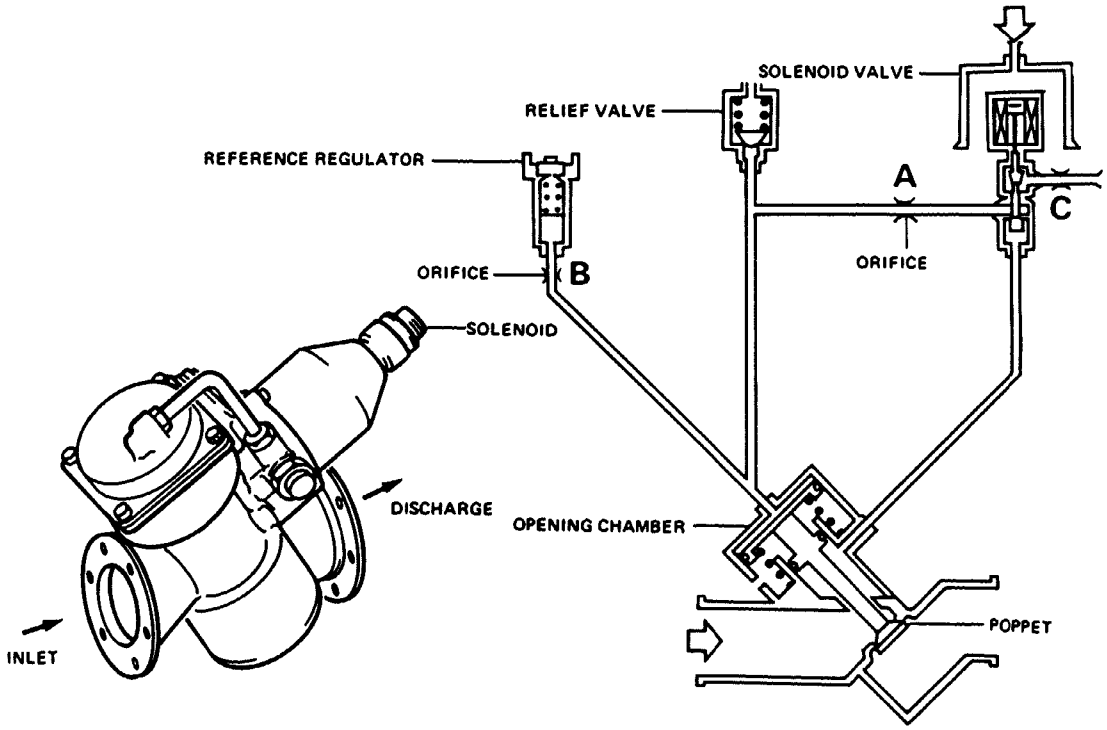
Y Check Valve (Post TLOD)
Figure 003



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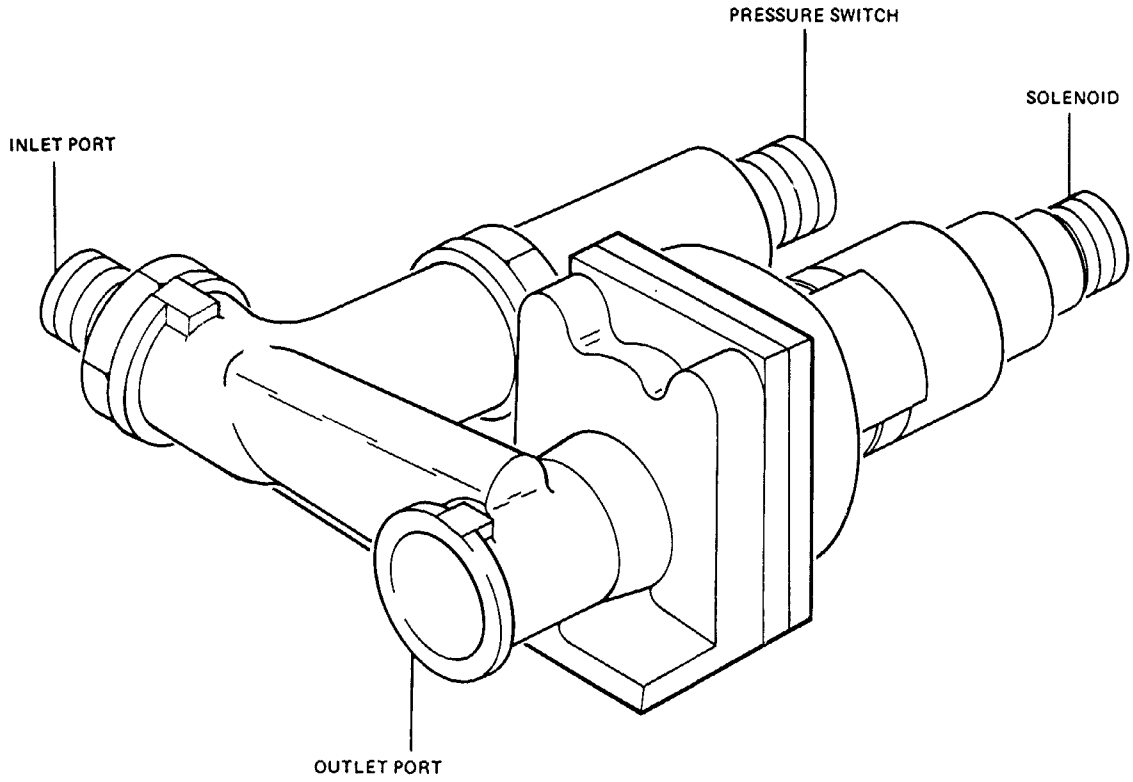
Pressure Regulating and Shut-Off Valve
Figure 004



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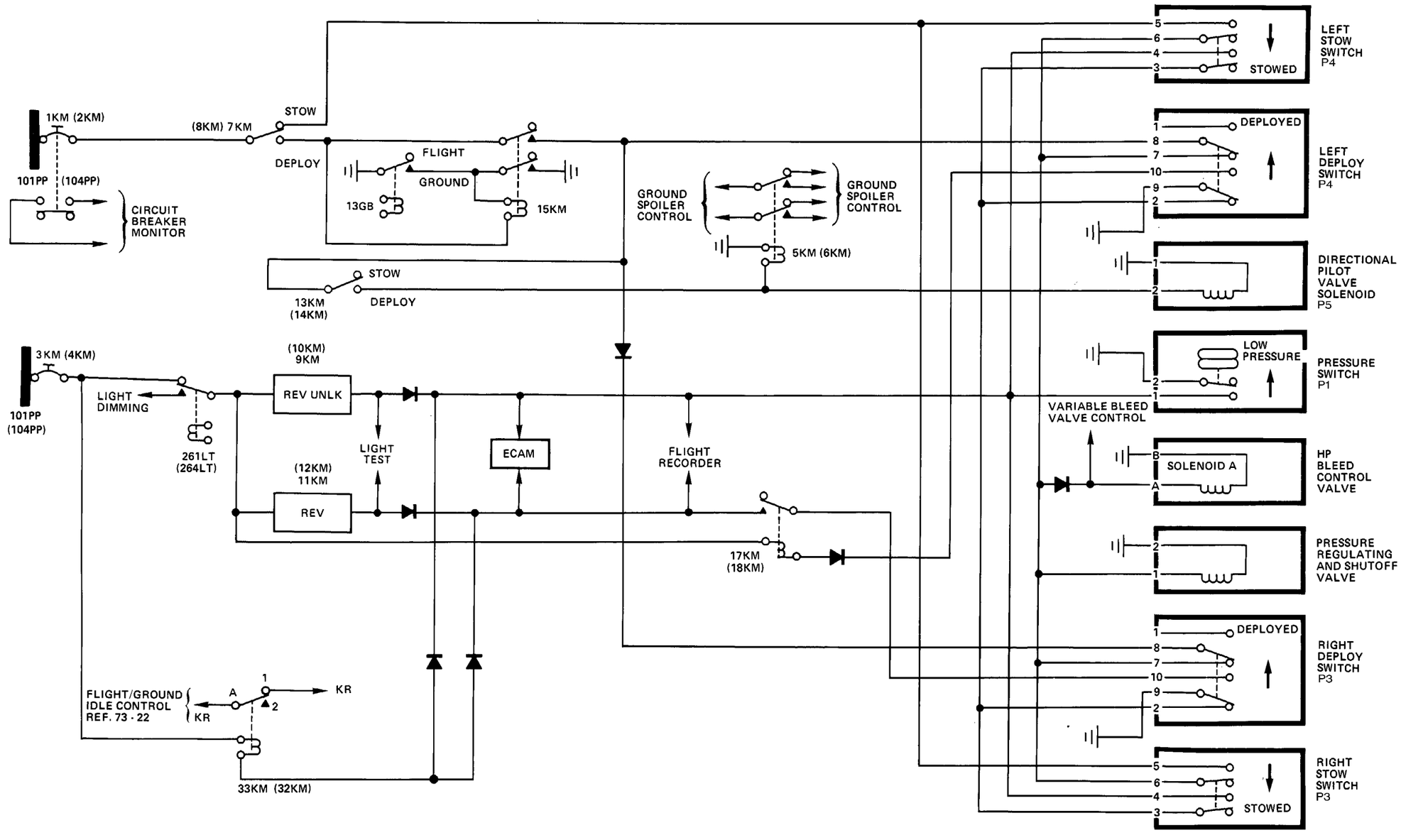
Directional Pilot Valve
Figure 005



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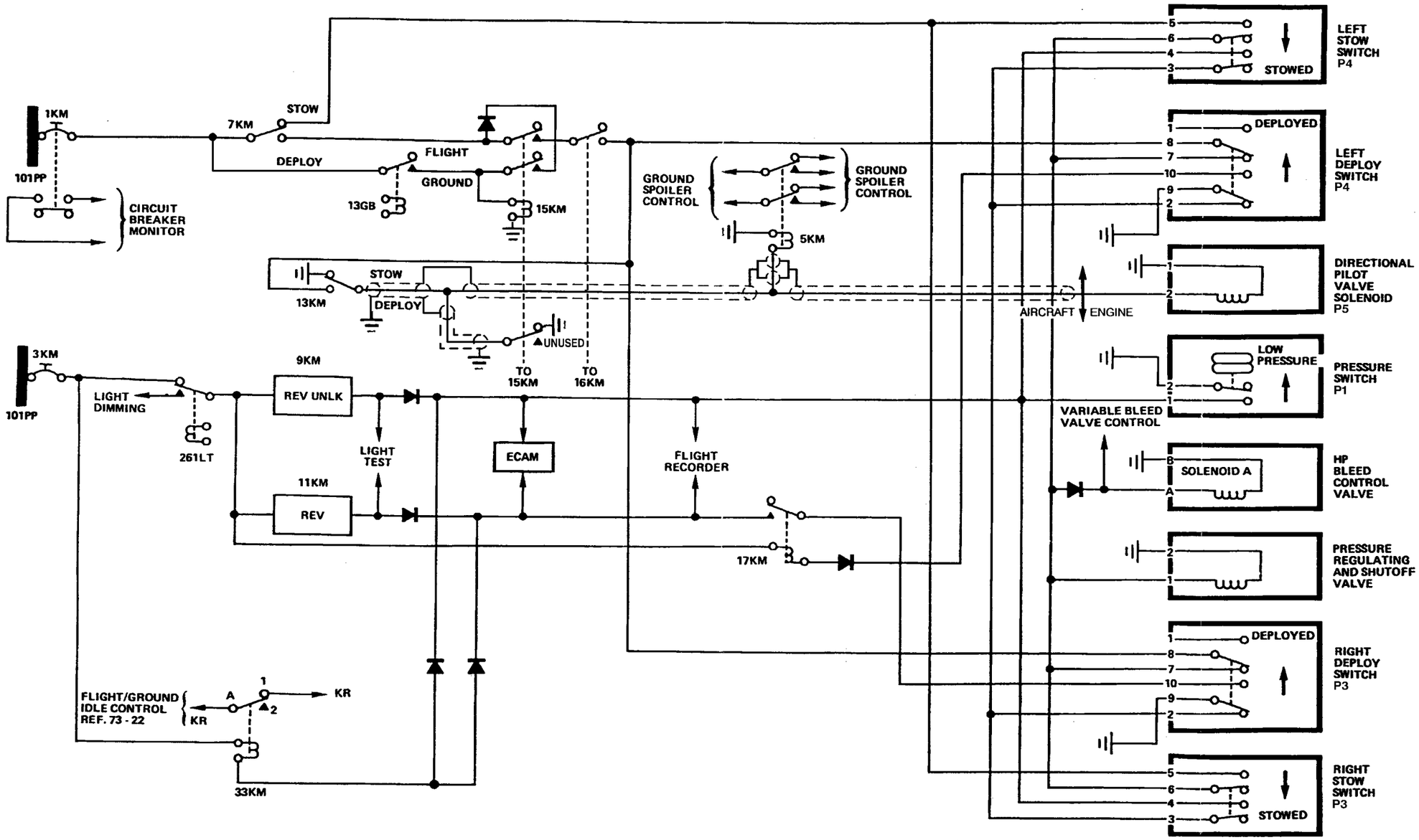
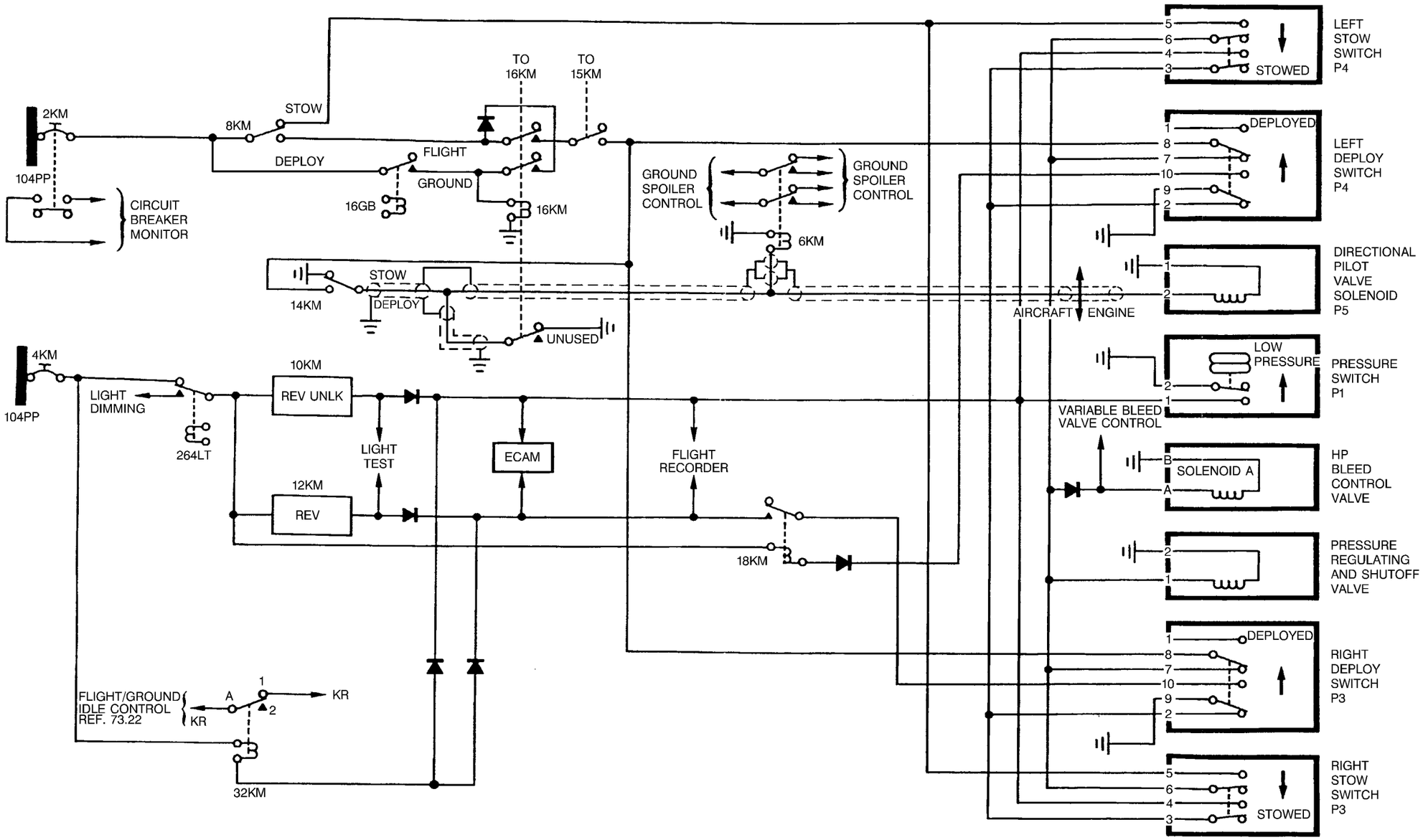
Thrust Reverser Control and Indicating ENG1 (ENG2)
Figure 006



Thrust Reverser Control and Indicating ENG1 (Sheet 1/2)
Figure 007

R



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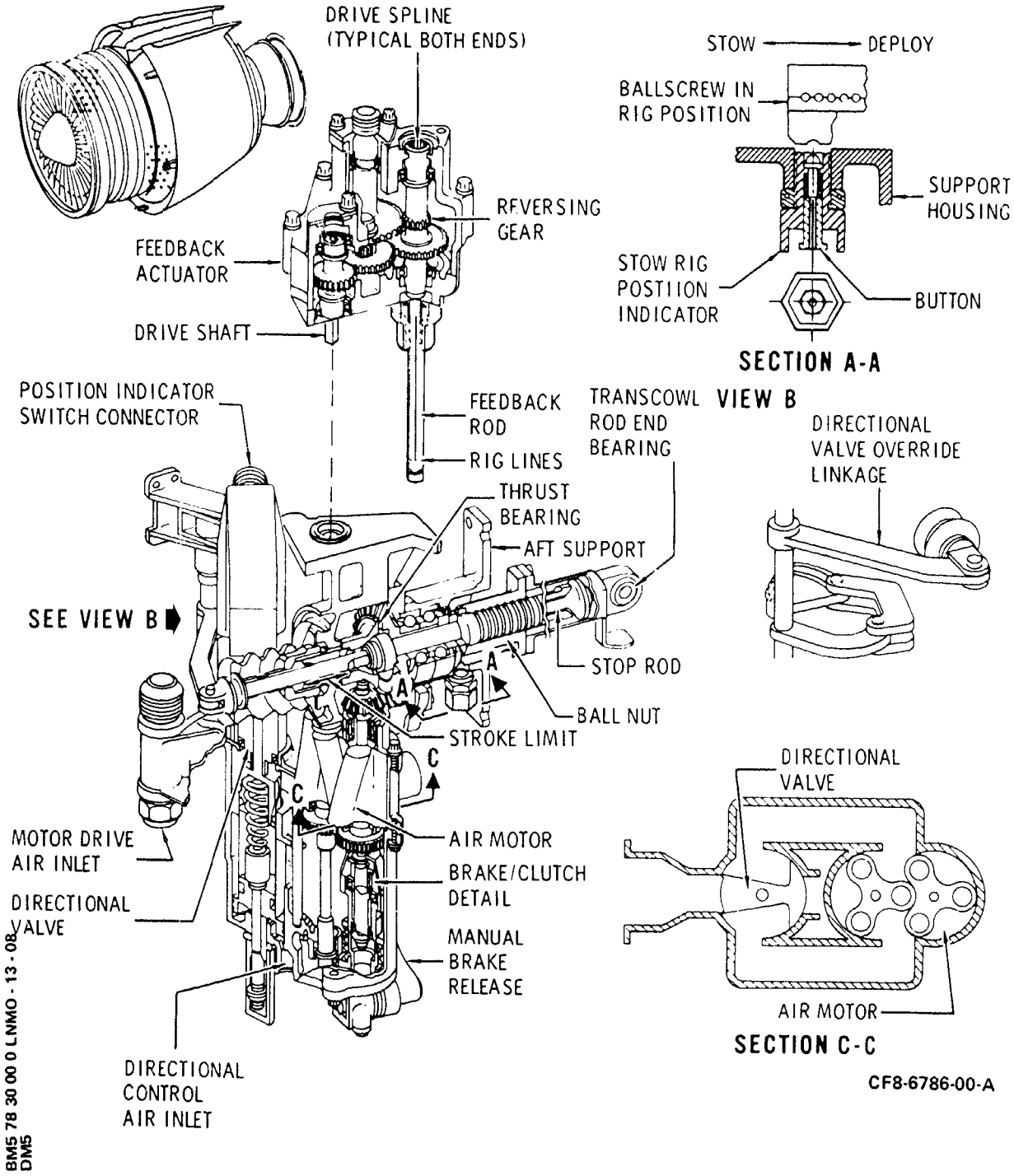
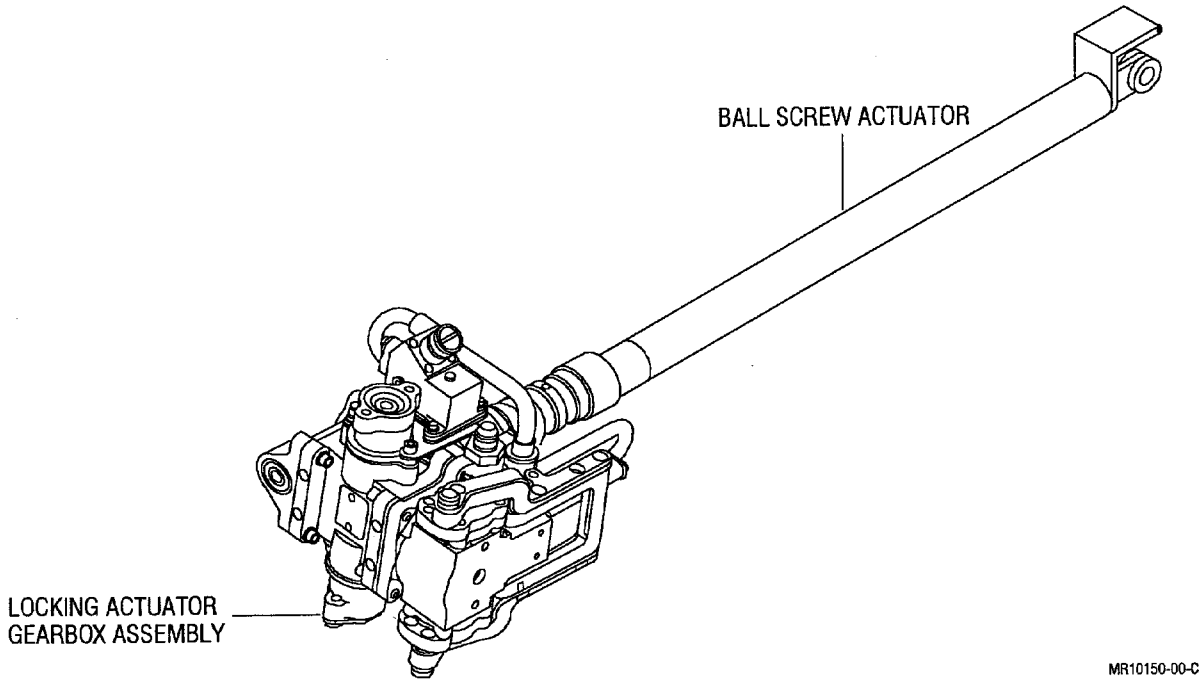
Thrust Reverser Control and Indicating ENG2 (Sheet 2/2)
Figure 007

R



Pneumatic Drive Motor/Actuator
Figure 008



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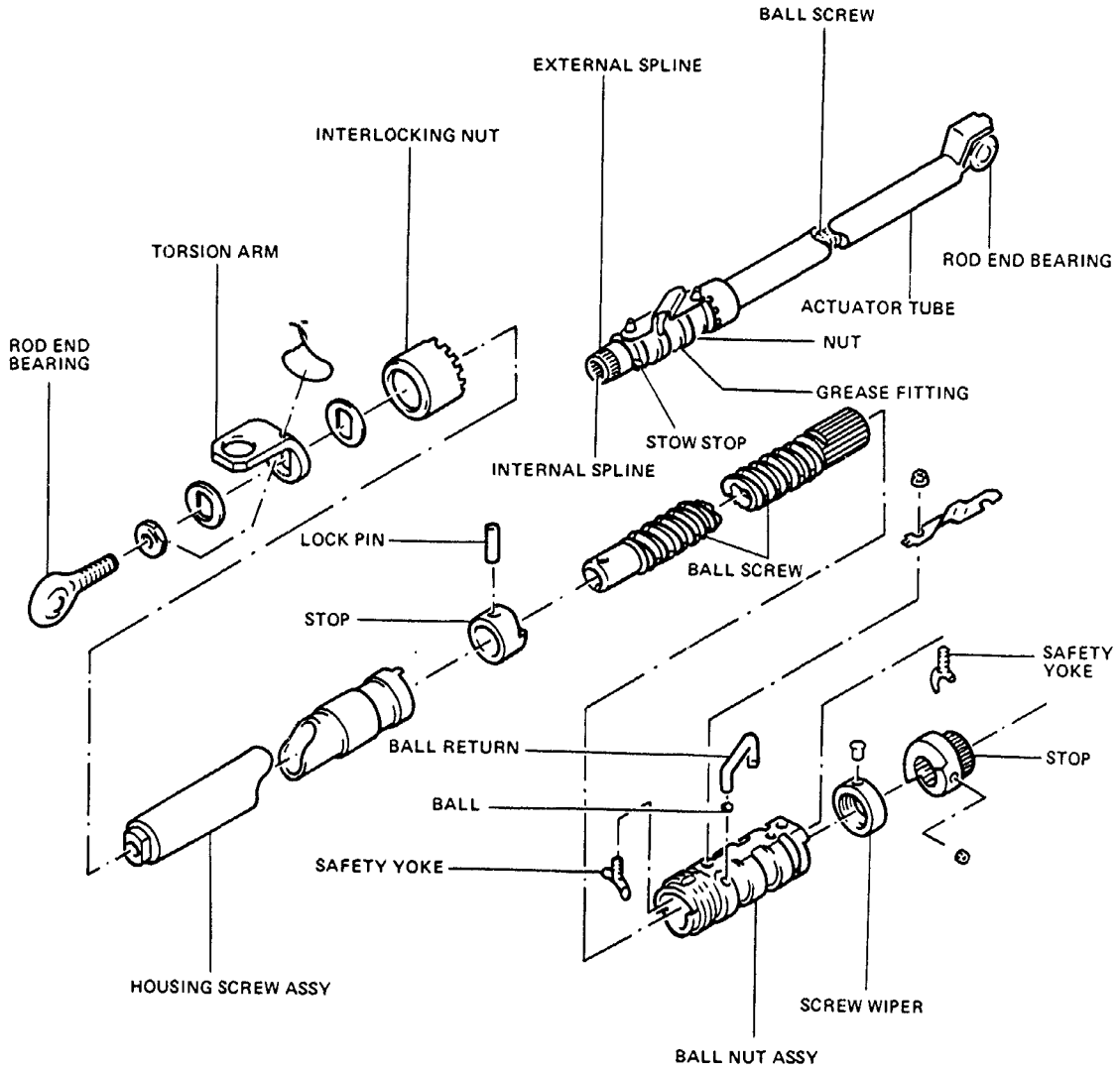
Locking Actuator Gearbox Assembly
Figure 009



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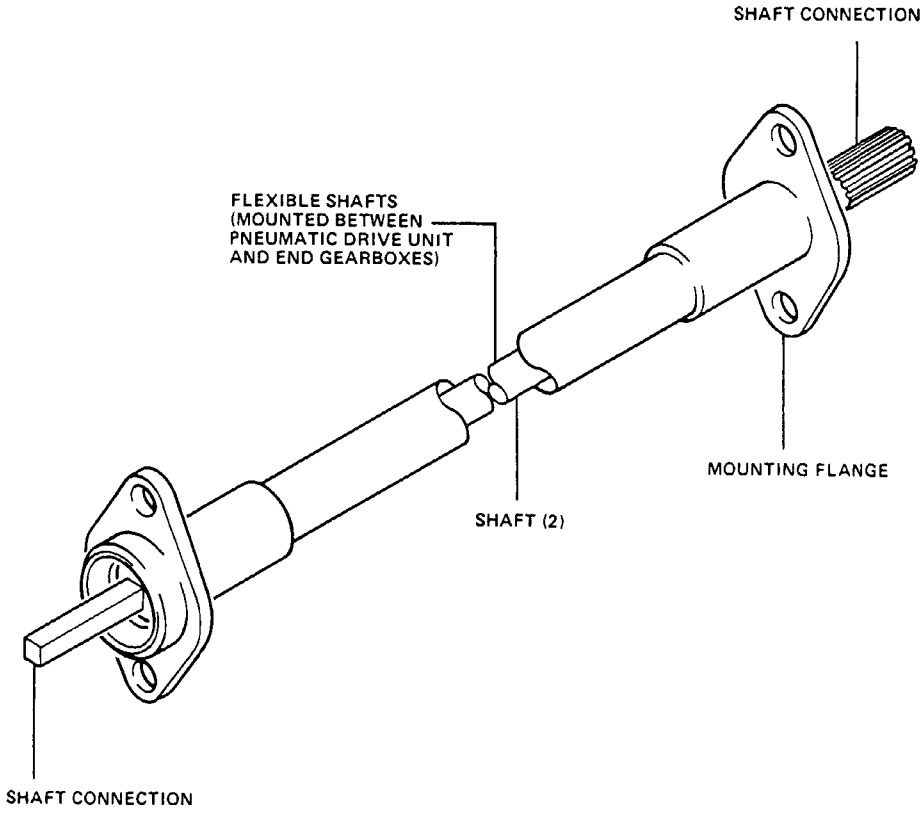
Ball Screw Actuator
Figure 010



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Flexible Drive Cable
Figure 011

3. System Operation (Ref. Fig. 006)

**ON A/C 001-100,

Post SB 78-2011 For A/C 001-100,

3. System Operation (Ref. Fig. 007)

**ON A/C 001-100,

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The system thrust reverser control lever is operative only when the throttle control lever is in idle position.

A. Thrust Reverser Deployment
When the thrust reverser control lever is moved to the interlock position (53° point), throttle microswitch 13KM (14KM), microswitch 7KM (8KM), and microswitch 44KM (45KM) close.
Relays 48KM (49KM), 53KM (54KM), 55KM (56KM), and 50KM (51KM) energize to allow power to the pressure regulating and shut off valve (PRSOV), directional pilot valve (DPV), and locking actuator assembly (LAA) solenoids, however, relay 48KM has a 0.25 second time delay to prevent power to the DPV and PRSOV before the locking bars or the LAA are released.
In ground configuration only, microswitch 7KM (8KM) energizes solenoid A on the high pressure valve (HPV) and also allows energization of the solenoid on the PRSOV. The HPV opens if the 8th stage bleed pressure is below 87 psig. If the bleed pressure is above 87 psig, the HPV remains closed and 8th stage bleed air is admitted to the system by way of the 8th stage check valve. The pressure regulating shut off valve opens and controls the pressure if required.
Once the PRSOV opens, the thrust reverser pneumatic system is pressurized, the pressure switch closes, the REV UNLK amber warning light comes on and relay 32KM (33KM) is energized.
Microswitch 13KM (14KM) provides an electrical signal to the directional pilot valve solenoid which closes the DPV vent and opens the supply port to allow pressure to the directional control valve piston of each pneumatic drive motor/actuator. Once pressurized, the directional control valve rotates to a deploy position to enable admission of pressure into the deploy side of the drive motor. Pressurization of the directional control valve piston also releases the pneumatic drive motor/actuator cone brake to allow the pneumatic drive motor/actuator to operate in the deploy direction.
With the motor pressurized and the brake released, the drive motors/actuators move the fan reverser cowls to the deploy position. After about 1/4 in. (6.3 mm) of travel, the left and right sides stow switches close and send an electrical signal to REV UNLK warning light which remains

on.
As the pneumatic drive motors/actuators approach the deploy position (at approximately 1.00 in. (25 mm) from deploy position) the feedback stop rods are engaged and pulled towards the extend stop.
As the stop rods are pulled towards the deploy position, the directional control valves are pulled towards a neutral position. This action in the directional control valves reduces motor speed prior to impact with the deploy stops and eliminates the application of motor stall torque against the stops.

**ON A/C 001-100,

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The motion of the feedback rod towards the extend stops is used to actuate the deploy indicator switches.
At about 0.5 in. (12.7 mm) from the nominal deploy position, these deploy switches change contact and the green REV indicator light comes on and power to the PRSOV solenoid is removed.
The PRSOV closes about 1/2 second later due to time delay orifice C in the PRSOV.
The manifold is non-pressurized and the pressure switch (P1) changes contact and signals the ECU; the amber REV UNLK warning light goes off but relays 32KM, 33KM are still energized.
The throttle feedback unit releases the throttle and the thrust reverser control lever is then free to move.
Reverse full power may be applied for 113°30' thrust reverser control lever position.
When the pneumatic drive motor/actuators are moved to within 0.12 in. (3,2 mm) of the nominal deploy position, the feedback rods are pulled solidly against their extend stops. With proper rigging, the slave actuators have 0.12 in. (3,2 mm) of travel remaining before they can contact their rotary dog stops. Therefore, the feedback rods become the primary extend stops. These stops must withstand the forces caused by the drive motor/actuator impact plus the fan reverser aiding loads. The flexibility of these rods in tension provides a cushioned stop ; however the deflection of the rods will normally be less than 0.12 in. (3,2 mm). Therefore the reverser will normally stop slightly short of the nominal extend position and the slave actuators will not bottom out during actuating to the extend position.
The DPV and LAA remain energized during reverser thrust.

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B. Thrust Reverser Stowage
To retract the system, the thrust reverser control lever must be moved towards reverse idle. At approximately 18.5 degrees, microswitches 7KM

(8KM) and 13KM (14KM) open to de-energize the DPV solenoid. HPV and PRSOV solenoids are energized through the stow switches (auto-restow line). Relays 51KM (50KM) and 55KM (56KM) remain energized for 10 seconds after relays 7KM (8KM) and 13KM (14KM) open. This 10 second time delay keeps the LAA locking bars disengaged during the stowing sequence.
The PRV then opens and regulates as in the deploy mode.
The manifold is pressurized, the pressure switch closes and the amber REV UNLK warning light comes on.
With the DPV venting and its supply air cut-off, the spring in the directional control valves returns the valve to a stow direction, this causes the actuators to move toward stow. There is no longer a signal to the brake release piston ; however, the brake is not capable of inhibiting action towards the stow direction because it is free-spinning in this direction. When in transit, the deploy switch circuits opens and REV indicator light goes off.
As the system reaches the last 1.00 in. (25 mm) of the stow stroke, the feedback rods are contacted by the extension tube end cap and they move toward stow, hitting firmly against the stops when the system reaches full stow. Prior to stow impact, the motion of the feedback rods gradually pulls the directional control valves towards null, thereby slowing the speed of the motors/actuators.
At about 0.25 in. (64 mm) from stow, the stow switch circuits open ; this commands the PRV to close and places the HPV under the control of the aircraft pneumatic system. The manifold is non-pressurized and the pressure switch opens, the amber REV UNLK warning light goes off and relays 32KM, 33KM are de-energized. Since the valves do not close immediately, there is sufficient airflow to insure completion of the stow stroke and lock-up of the system preload. When the system reaches the fully stowed position, the feedback rods are pushed firmly against their respective stow stops and the slave actuators contact their rotary dog stops. While the drive motor/actuators are impacting against the feedback rods, the brakes are engaged but run in the free slip stow direction.
Since the brakes are self-locking in the deploy direction, they lock in the preload that exists at the fully stowed position.
10 seconds after the stow command, the LAA solenoids are de-energized to allow engagement of the LAA locking bars.

**ON A/C 001-100,

C. Thrust Reverser Stowed
With the system at rest, microswitches 7KM (8KM) and 13KM (14KM) circuits are open.
Pressure exists at the inlet of the thrust reverser pressure regulating and shut-off valve as established by engine bleed valves from the aircraft ECS system. This pressure is not admitted to the thrust reverser actuation system because the pressure regulating and shut-off valve is closed.
Without pressure, the brakes are engaged and are holding the ball screw actuators solidly against the feedback stop rods. The feedback rods are solidly held against their respective stow stops and are slightly deflected in compression.

The slave actuators are in stowed position and the flexible shafts are slightly twisted, holding a preload against the ball screw stops. Without operating pressure, the directional control valves are spring-loaded to the stow position.

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THRUST REVERSER SYSTEM - MAINTENANCE PRACTICES

1. General

A. This procedure gives the instructions to do the checks that follow.
(1)CDU brake holding torque check.
(2)Inspection of the inner bondment seal.
(3)Inspection of the center web and end webs.
(4)Translating cowl auto re-stow function check.
(5)Directional Pilot Valve (DPV) pressure switch check.
(6)Locking actuator assembly (LAA) brake holding torque check.
(7)Check the thrust reverser manual stow and deploy with the LAA installed.

B. These checks must be done for the reasons that follow.
(1)To see if the torque needed to overcome the CDU brake is less than the minimum value permitted.
(2)To find all cuts, tears, nicks, holes, and missing sections in the inner bondment seal.
(3)To find all dents, cracks, holes, and loose fasteners in the center web and end webs.
(4)To find hidden faults in the translating cowl auto re-stow system which cannot be found through flight compartment indications.
(5)To find whether the DPV pressure switch has failed in the open position, such that it will not indicate a pressurized system.
(6)To find if the LAA brake holding torque is correct.
(7)To check if the translating cowl can be stowed and deployed manually.

C. The conditions given in paragraph B. can result in an increased probability of inadvertent deployment of the translating cowl while in flight.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Dial-type torque wrench, 0-100 lbf.in. (0-1.13 m.daN)
C. Material No.C01-007	Adhesives, Plastics, Sealants (Ref. 70-00-00)
D. Material No.C03-006	Finishes and Protective Coatings (Ref. 70-00-00)
Referenced Procedures	
- 23-44-00, P. Block 501	Cabin and Service Interphone
- 24-41-00, P. Block 301	AC External Power
- 36-00-00, P. Block 1	Pneumatic - General
- 71-13-00, P. Block 301	Cowl Doors

ITEM	DESIGNATION
- 78-31-00, P. Block 901	Thrust Reverser System
- 78-31-01, P. Block 401	Center Drive Unit/Feedback Gearbox Assembly
- 78-32-13, P. Block 401	Translating Cowl Inner Bondment Seal

**ON A/C 001-100,

3. Procedure

A. Do a Check of the Center Drive Unit (CDU) Brake Holding Torque

WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL.
MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1)Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF ACCIDENTAL THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THAT THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW BEFORE YOU OPERATE THE THRUST REVERSER.

(2)Remove the two bolts that attach the manual drive lockout cover to the CDU and remove the lockout cover (Ref. Fig. 201).

(3)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position (Ref. Fig. 202). The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.

(4)With the translating cowl at the stow rig position, pull the manual brake release lever on the CDU.

NOTE : The release of the CDU brake will remove pre-load that can occur during a stow cycle.

(5)Engage the manual brake release lever on the CDU into its retaining clip.

(6)Install a 0.25 in. (6.4 mm) drive and a dial-type torque wrench into the CDU manual drive pad.

CAUTION : DO NOT USE MORE THAN 100 LBF.IN. (1.13 M.DAN) OF TORQUE WHEN YOU DO THE CHECK. TOO MUCH TORQUE WILL DAMAGE THE CDU.

(7)Do the brake holding torque check as follows.

(a)Turn the torque wrench and try to manually deploy the translating cowl until you get a minimum of 15 lbf.in. (0.17 m.daN) of torque.

(b)If the manual drive turns in the deploy direction with less than 15 lbf.in. (0.17 m.daN) of torque, replace the CDU or deactivate the thrust reverser (Ref. 78-31-01, P. Block 401 or 78-31-00, P. Block 901).

(c)If the CDU brake holds the 15 lbf.in. (0.17 m.daN) of holding torque, increase the torque until the CDU brake slips, or until you get a

maximum of 100 lbf.in. (1.13 m.daN).

(d)Record the value between 15 and 100 lbf.in. (0.17 and 1.13 m.daN) of torque when the CDU brake slips. If the CDU brake does not slip at 100 lbf.in. (1.13 m.daN) of holding torque, release the torque and record 100 lbf.in. (1.13 m.daN) on the inspection record.

(8)Pull the manual brake release lever on the CDU to release the CDU brake.

(9)Put the translating cowl in the stow rig position.

(a)Move the translating cowl forward to the stowed position.

(b)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position (Ref. Fig. 202). The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.

(10)Engage the manual brake release lever on the CDU into its retaining clip.

(11)Install the lockout cover on the CDU manual drive pad, and attach it with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(12)Do steps (2) through (11) again for the other thrust reverser half.

(13)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

(14)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

(15)Remove the safety clips and tags, and close the previously opened circuit breakers.

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B. Do a Visual Inspection of the Inner Bondment Seal for Cuts, Tears, Nicks, Holes and Missing Sections

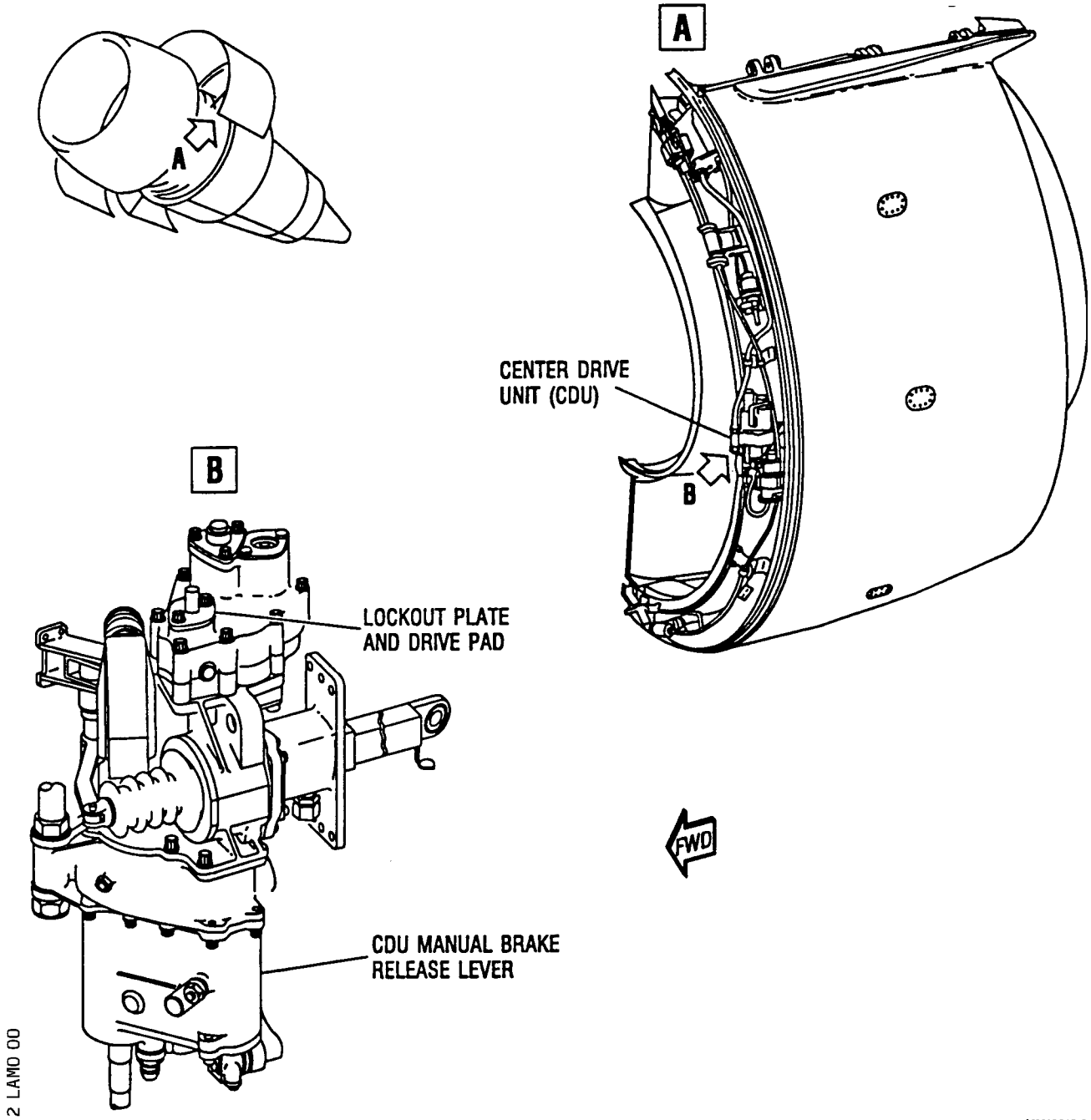
WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL.
MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1)Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF ACCIDENTAL THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THAT THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW BEFORE YOU OPERATE THE THRUST REVERSER.

CAUTION : DO NOT OPEN THRUST REVERSER HALF TO MORE THAN THE 34 DEGREE (FIRST STICK) POSITION OR DAMAGE TO THE TRANSLATING COWL OR THE STRUT CAN OCCUR WHEN THE TRANSLATING COWL IS EXTENDED OR RETRACTED.



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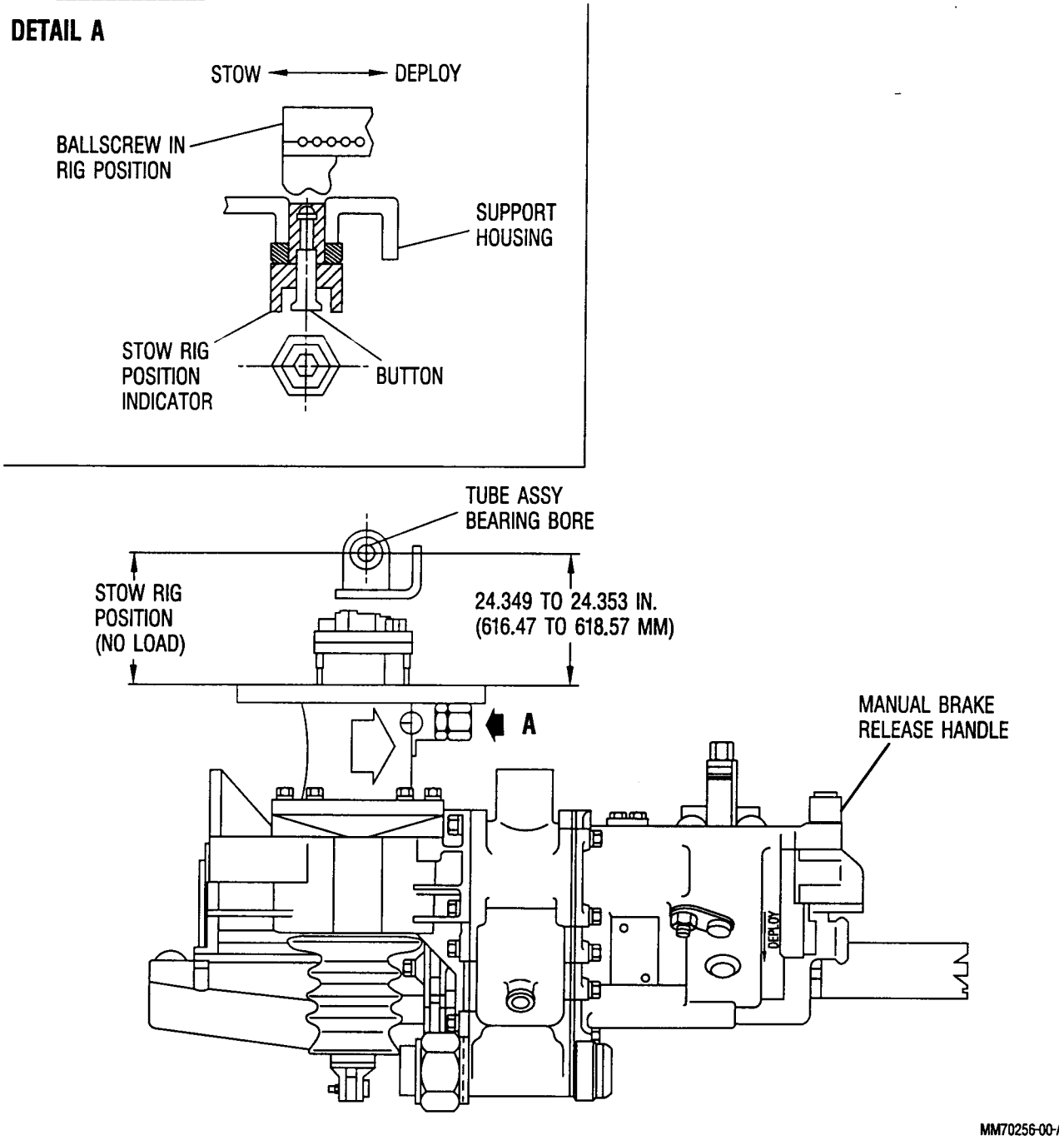
Center Drive Unit (CDU)
Figure 201



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CDU Stow Rig Position Indicator
Figure 202

CAUTION : BEFORE YOU OPEN A THRUST REVERSER HALF, MAKE SURE TO FULLY RETRACT THE WING LEADING EDGE SLATS. THIS WILL PREVENT DAMAGE TO THE THRUST REVERSER HALF AND TO THE SLATS.

(2)Open the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(3)Pull the manual brake release lever on the CDU to release the CDU brake.

(4)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)

(a)Push in the two buttons located on the LAA manual release lever.

(b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(5)Remove the two bolts that attach the manual drive lockout cover to the CDU and remove the lockout cover (Ref. Fig. 201).

(6)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad and deploy the translating cowl approximately 7.0 in. (177.8 mm).

NOTE : For maximum visibility of the inner bondment seal, deploy the translating cowl to the position where the blocker doors start to dip into the flow path.

(7)Visually inspect all of the inner bondment seal (Ref. Fig. 203). Refer to the inspection limits that follow.

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(a) Radial cuts, splits, or tears	Up to 5 cuts, splits, or tears over the length of the seal	Over the serviceable limits, replace the seal or deactivate the thrust reverser (Ref. 78-32-13, P. Block 401 or 78-31-00, P. Block 901)
(b) Circumferential cuts, splits, or tears	At the vent holes, any amount of cuts, splits, or tears through the fabric up to 0.5 in. (12.7 mm) in length	Over the serviceable limits, replace the seal or deactivate the thrust reverser (Ref. 78-32-13, P. Block 401 or 78-31-00, P. Block 901)
	In areas between the vent holes, no amount is permitted	Replace the seal or deactivate the thrust reverser (Ref. 78-32-13, P. Block 401 or 78-31-00, P. Block 901)
(c) Nicks that do not go through the seal	Maximum of 0.25 in. (6.4 mm) length or width, separated by 5 in. (127 mm) circumferentially	Over the serviceable limits, replace the seal or deactivate the thrust reverser (Ref. 78-32-13, P. Block 401 or 78-31-00, P. Block 901)
(d) Punctures and pin holes that go through the seal	No visible through-holes or punctures are permitted	Replace the seal or deactivate the thrust reverser (Ref. 78-32-13,

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		P. Block 401 or 78-31-00, P. Block 901)

NOTE : The P-seals are manufactured with drain holes on the outboard side of the seal. These holes do not go through the seal. You can ignore these holes for this inspection.

(e) Missing sections	Not serviceable	Replace the seal or deactivate the thrust reverser (Ref. 78-32-13, P. Block 401 or 78-31-00, P. Block 901)

(8)Put the translating cowl in the stow rig position.
(a)Move the translating cowl forward to the stowed position.
(b)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position (Ref. Fig. 202). The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.
(9)Install the lockout cover on the CDU manual drive pad, and attach it with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN) (Ref. Fig. 201).
(10)Engage the manual brake release lever on the CDU into its retaining clip.
(11)Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(12)Close the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(13)Do steps (2) through (12) again for the other thrust reverser half.
(14)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(15)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).
(16)Remove the safety clips and tags, and close the previously opened circuit breakers.

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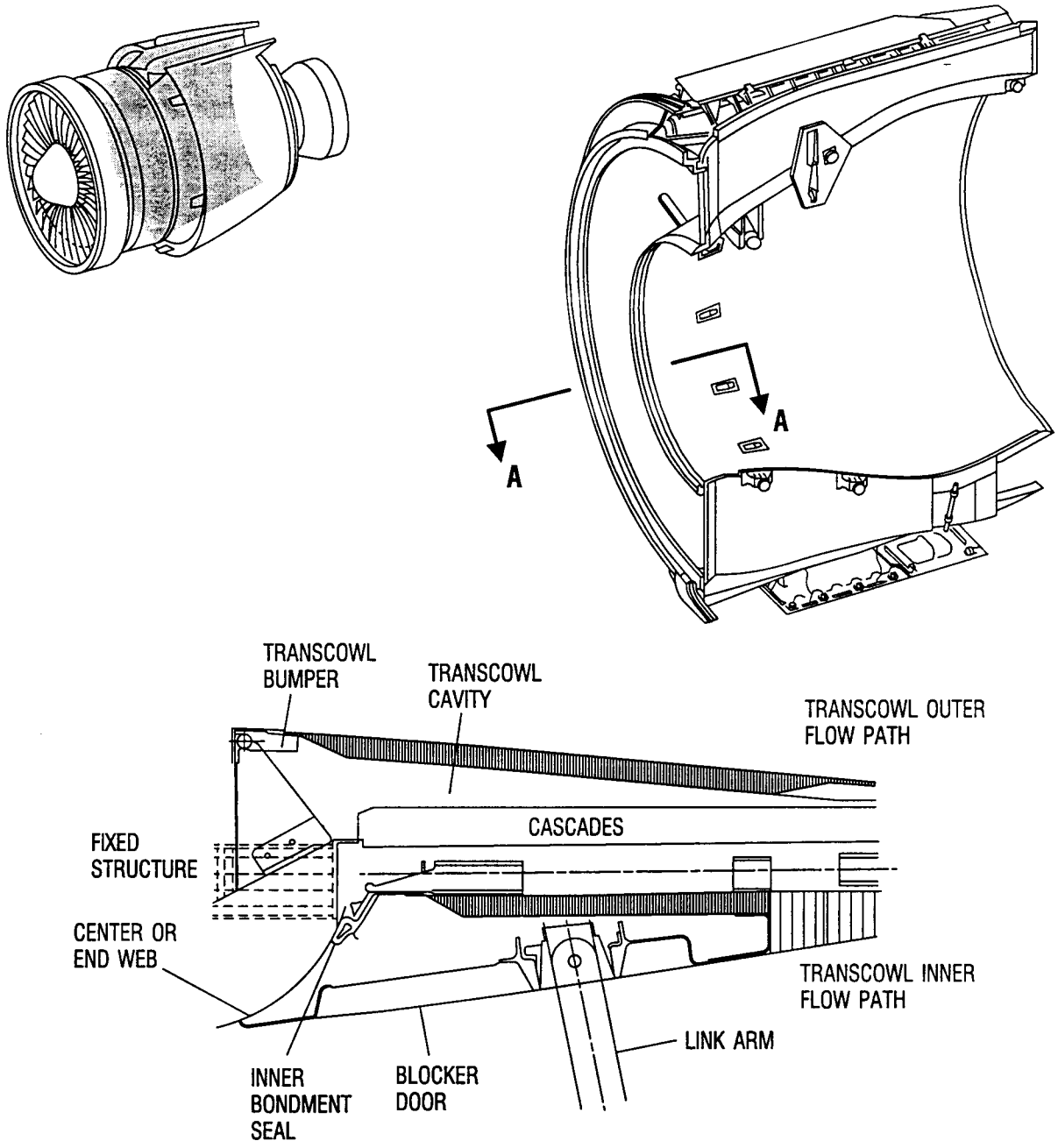
C. Do a Visual Inspection of the Center Web and the End Webs for Dents, Cracks, Holes, and Loose Fasteners
WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE



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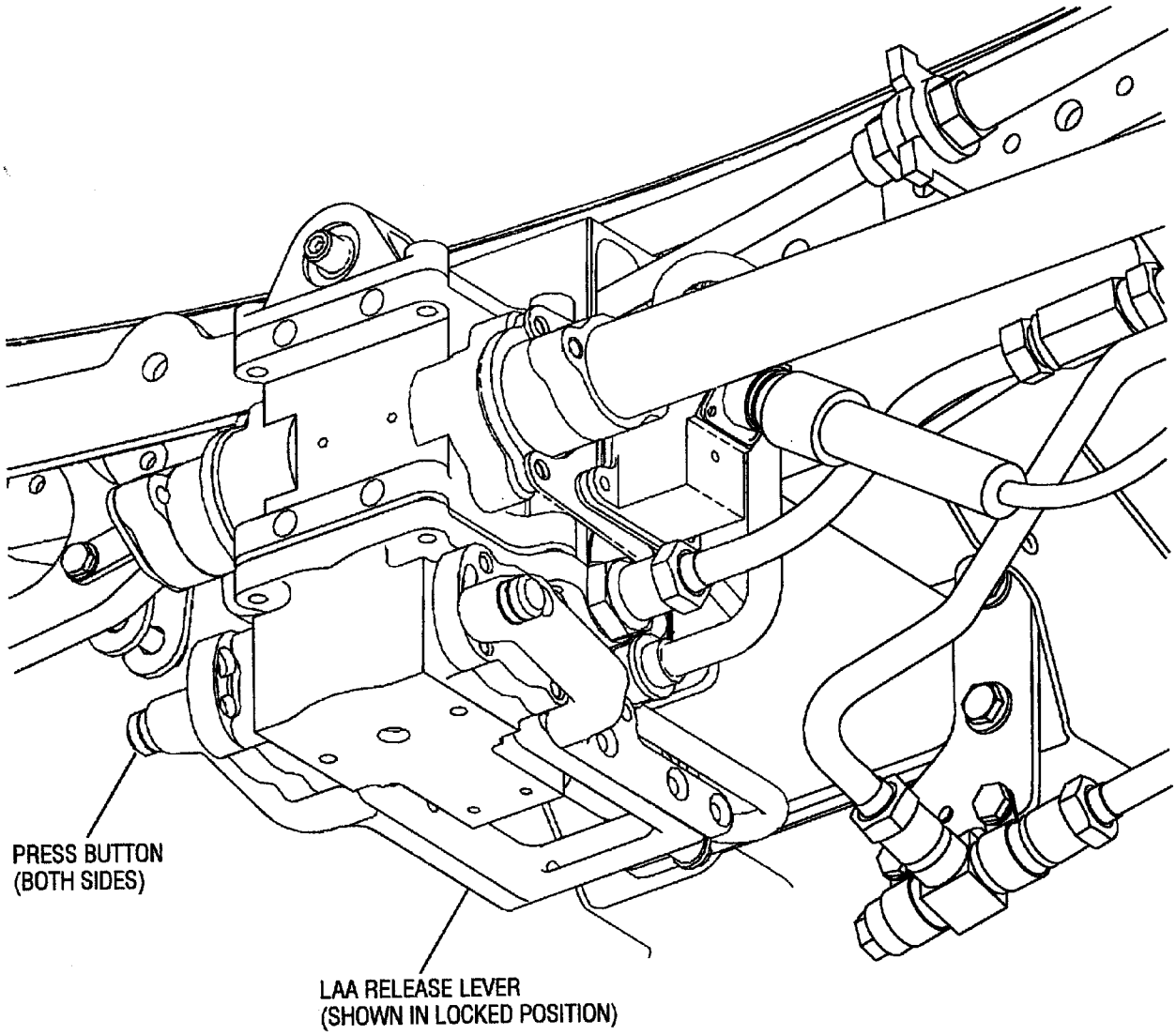
Translating Cowl Inner Bondment Seal Location
Figure 203



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Locking Actuator Assembly - Locking Release Lever
Figure 204

DEATH OR SERIOUS INJURY TO PERSONNEL.
MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1)Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF UNCOMMANDED THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THAT THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW BEFORE YOU OPERATE THE THRUST REVERSER.

CAUTION : DO NOT OPEN THRUST REVERSER HALF TO MORE THAN THE 34 DEGREE (FIRST STICK) POSITION OR DAMAGE TO THE TRANSLATING COWL OR THE STRUT CAN OCCUR WHEN THE TRANSLATING COWL IS EXTENDED OR RETRACTED.

CAUTION : BEFORE YOU OPEN A THRUST REVERSER HALF, MAKE SURE TO FULLY RETRACT THE WING LEADING EDGE SLATS. THIS WILL PREVENT DAMAGE TO THE THRUST REVERSER HALF AND TO THE SLATS.

(2)Open the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(3)Pull the manual brake release lever on the CDU to release the CDU brake.
(4)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(5)Remove the two bolts that attach the manual drive lockout cover to the CDU and remove the lockout cover.
(6)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad and deploy the translating cowl approximately 7.0 in. (177.8 mm).
(7)Visually inspect the center web and the end webs (Ref. Fig. 205). Refer to the inspection limits that follow.

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(a) Dents	Up to 0.060 in. (1.52 mm) in depth	Within the serviceable limits, no repair is necessary.
	Not serviceable over 0.060 in. (1.52 mm) in depth	If the dents are 0.061-0.120 in. (1.55-3.05 mm) in depth, straighten the dent with a dent puller, apply Material No.C03-006, and fill with Material No.C01-007. If the dents are more than 0.120 in. (3.05 mm) in depth, replace the web or deactivate the thrust reverser (Ref. 78-31-00,

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		P. Block 901)
(b) Cracks aft of the rivet line, but not within 0.25 in. (6.35 mm) of a rivet in the rivet line	Any number of cracks are permitted, with each crack up to 2.0 in. (50.8 mm) in length, and a total length of all cracks less than 12.0 in. (308.4 mm) and a minimum distance of 2.0 in. (50.8 mm) between the cracks	Stop-drill the crack, and fill with Material No.C01-007
Cracks within 0.25 in. (6.35 mm) of a rivet in the rivet line	Not serviceable	Replace the web or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901)
Cracks forward of the rivet line	Not serviceable	Replace the web or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901)
Cracks longer than 2.0 in. (50.8 mm)	Not serviceable	Replace the web or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901)
(c) Holes	Four holes or less, with a maximum diameter of 0.10 in. (2.54 mm). There must be a minimum distance of 1.00 in. (25.4 mm) between the holes	Within the serviceable limits, no repair is necessary. Over the serviceable limits, replace the web or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901)
(d) Loose fasteners	Not serviceable	Replace the loose fasteners or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901)

(8)Put the translating cowl in the stow rig position.
(a)Move the translating cowl forward to the stowed position.
(b)Push the button on the CDU stow rig position indicator to make sure

that the translating cowl is in the stow rig position (Ref. Fig. 202). The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.

(9) Install the lockout cover on the CDU manual drive pad, and attach it with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(10) Engage the manual brake release lever on the CDU into its retaining clip.

(11) Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)

(a) Push in the two buttons located on the LAA manual release lever.

(b) Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(12) Close the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(13) Do steps (2) through (12) again for the other thrust reverser half.

(14) Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

(15) Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

(16) Remove the safety clips and tags, and close the previously opened circuit breakers.

**ON A/C 001-100,

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D. Do a Check of the Translating Cowl Auto Re-stow Function

NOTE : The auto re-stow function check is done two times. To permit sufficient time for correct verification of the flight compartment light indications, the first check of the auto re-stow function is done with the translating cowl deployed 10 in. (254 mm). To make sure that the auto re-stow function is prompt, the second check is done with the translating cowl deployed 1.0 in. (25.4 mm).

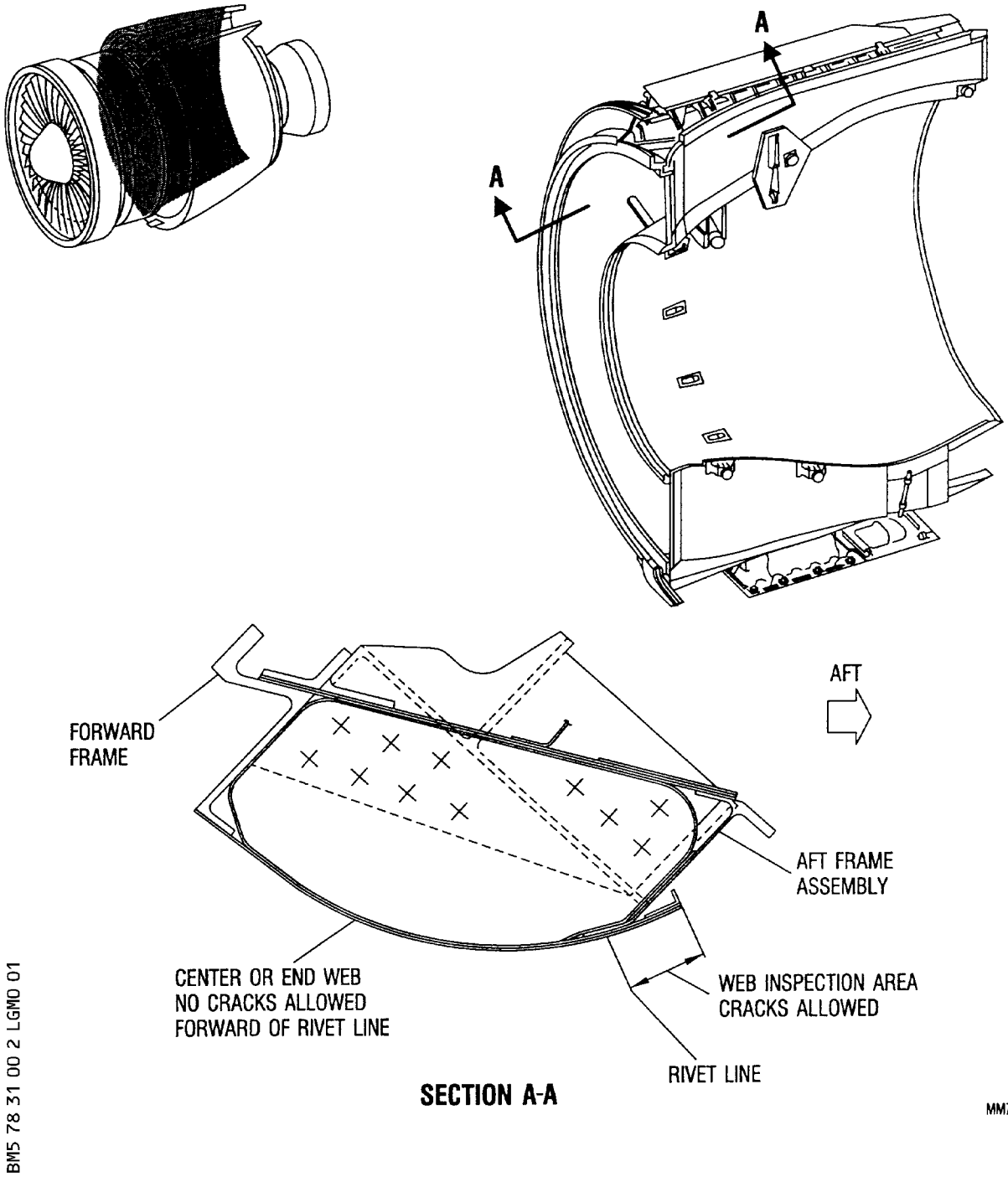
WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL.
MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1) Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

(2) Connect the electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3) Connect the interphone system between the flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).

WARNING : IF INSPECTION OR MAINTENANCE WILL BE DONE WITH THE TRANSLATING COWL DEPLOYED, REMOVE THE AIR SUPPLY FROM THE THRUST REVERSER



Center or End Web Location
Figure 205

SYSTEM. WITH THE AIR SUPPLY CONNECTED, LOSS OF ELECTRICAL POWER CAN CAUSE THE THRUST REVERSER TO STOW.
INADVERTENT STOW CAN CAUSE DEATH OR SERIOUS PERSONAL INJURY.

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF UNCOMMANDED THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THAT THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW BEFORE YOU OPERATE THE THRUST REVERSER.

(4)Pull the manual brake release lever on the CDU to release the CDU brake.
(5)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)
  (a)Push in the two buttons located on the LAA manual release lever.
  (b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(6)Remove the two bolts that attach the manual drive lockout cover to the CDU and remove the lockout cover (Ref. Fig. 201).
(7)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad and deploy the translating cowl approximately 10.0 in. (254 mm).
(8)Engage the manual brake release lever on the CDU into its retaining clip.
(9)Connect an external pneumatic power source to the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).
(10)Close the applicable circuit breakers. Make sure that the amber REV UNLK indicator light in the flight compartment is initially on and then goes off. If the light is not on, refer to the Trouble Shooting Manual, or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).
(11)Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)
  (a)Push in the two buttons located on the LAA manual release lever.
  (b)Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(12)If the translating cowl does not re-stow itself, refer to the Trouble Shooting Manual, or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).
(13)Disconnect the external pneumatic power source from the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).
(14)Open the applicable circuit breakers.
(15)Pull the manual brake release lever on the CDU to release the CDU brake.
(16)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)
  (a)Push in the two buttons located on the LAA manual release lever.
  (b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(17)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad and deploy the translating cowl approximately 1.0 in. (25.4 mm).
(18)Engage the manual brake release lever on the CDU into its retaining clip.
(19)Connect an external pneumatic power source to the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).
(20)Close the applicable circuit breakers. Make sure that the translating cowl goes to the fully stowed position. If the translating cowl does not re-stow itself, refer to the Trouble Shooting Manual, or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).

(21)Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 204)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(22)Disconnect the external pneumatic power source from the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).
(23)Open the applicable circuit breakers.
(24)Make sure that the CDU is at stow rig position.
(a)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position (Ref. Fig. 202). The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.
(25)Install the lockout cover on the CDU manual drive pad and attach with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(26)Do steps (4) through (25) again for the other thrust reverser half.
(27)Disconnect the interphone system between the flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).
(28)De-energize the aircraft electrical network and disconnect the electrical ground power unit (Ref. 24-41-00, P. Block 301).
(29)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(30)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).
(31)Remove the safety clips and tags, and close the applicable circuit breakers.

**ON A/C 001-100,

E. Do a Check of the DPV Pressure Switch Circuit

WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL.
MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1)Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Connect the electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Connect the interphone system between the flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).
(4)Remove the two bolts that attach the manual drive lockout cover to each CDU. Remove the lockout cover from the CDU on each thrust reverser half (Ref. Fig. 201).
(5)Invert the lockout cover of the CDU on each thrust reverser half. Install the lockout spline into each CDU. Attach each lockout spline in position with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

WARNING : IF INSPECTION OR MAINTENANCE WILL BE DONE WITH THE TRANSLATING COWL DEPLOYED, REMOVE THE AIR SUPPLY FROM THE THRUST REVERSER SYSTEM. WITH THE AIR SUPPLY CONNECTED, LOSS OF ELECTRICAL POWER CAN CAUSE THE THRUST REVERSER TO STOW. INADVERTENT STOW CAN CAUSE DEATH OR SERIOUS PERSONAL INJURY.

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF UNCOMMANDED THRUST REVERSER OPERATION.

(6) Connect an external pneumatic power source to the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).

NOTE : To make sure that there is sufficient system pressure at the DPV pressure switch and minimize the load on the CDU lockout splines, a source pressure between 15 and 30 psig (104 and 207 kPag) is recommended.

NOTE : The DPV pressure switch needs a minimum pressure of approximately 7 psig (48.3 kPag) at the switch to make the flight compartment indicator light come on.

(7) With the electrical and pneumatic sources connected to the system, move the flight compartment thrust reverser control levers to a deploy command position for a minimum amount of time to see the amber REV UNLK indication in the flight compartment. If there is no indication, refer to the Trouble Shooting Manual or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).

(8) Disconnect the external pneumatic power source to the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).

(9) Remove the two bolts that attach the manual drive lockout cover to each CDU. Remove the lockout spline from the CDU on each thrust reverser half.

(10) Make sure that the CDU on each thrust reverser half is at stow rig position.

(a) Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position (Ref. Fig. 202). The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.

(11) Invert the manual drive lockout cover on the CDU of each thrust reverser half. Install the lockout cover on the drive pad of each CDU so that the lockout spline is visible. Attach each cover with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in (0.37 and 0.42 m.daN).

(12) Disconnect the interphone system between the flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).

(13) De-energize the aircraft electrical network and disconnect the electrical ground power unit (Ref. 24-41-00, P. Block 301).

(14) Make sure the work area is clean and clear of tools and miscellaneous items of equipment.

(15) Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

(16) Remove the safety clips and tags, and close the applicable circuit breakers.

**ON A/C 001-100,

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F. Check the LAA Brake Holding Torque

WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL. MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1) Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF ACCIDENTAL THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THAT THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW PRIOR TO MANUAL OPERATION OF THE FAN REVERSER.

NOTE : To avoid an incorrect torque reading, the translating cowl must be deployed at least 1.0 in. (25.4 mm).

(2) Remove the two bolts that attach the lockout cover to the Center Drive Unit (CDU) manual drive pad and remove the lockout cover. Keep the removed bolts and lockout cover for assembly.

(3) Pull the manual brake release lever on the CDU to release the cone brake.

NOTE : The brake is released when the manual brake release lever is at an angle of approximately 60 degrees with the CDU body. The lever will move into a detent that can be felt. In all other positions the brake will not be released.

(4) Manually unlock the LAA as follows (Ref. Fig. 204).

(a) Push in the two buttons located on the LAA manual release lever.

(b) Pull up the release lever away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(5) Install a 0.2 in. (6.4 mm) square drive into the CDU manual drive pad.

(6) Manually turn the CDU to move the translating cowl 1.0 in. (25.4 mm) in the deploy direction.

(7) Remove the two bolts that attach the cover to the LAA manual drive pad and remove the cover. Keep the removed bolts and cover for assembly.

(8) Manually lock the LAA as follows (Ref. Fig. 204).

(a) Push in the two buttons located on the LAA manual release lever.

(b) Push down the release lever toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.

CAUTION : USE A STEEL TOOL TO AVOID TOOL FAILURE THAT CAN BE MISINTERPRETED AS LAA FAILURE.

(9) Install a 0.20 in. (5.1 mm) square extension tool and a dial-type torque wrench into the LAA manual drive pad.

(10) Turn the torque wrench in the deploy direction until torque increases to 208 lbf.in. (2.35 m.daN). (To make sure that the wrench is being turned in the deploy direction, watch the one-inch gap between the translating cowl and the fixed structure. If this gap starts to close, the wrench is being turned in the wrong direction (i.e., stow direction).

NOTE : Be aware of the torque wrench starting point when torque is applied.

(a)If the torque wrench can be turned in the deploy direction more than 180 degrees (one half turn) before 208 lbf.in. (2.35 m.daN) is reached the LAA must be replaced.
(b)If the translating cowl moves in the deploy direction with 208 lbf.in. (2.35 m.daN) or less of torque applied, you must replace the LAA.
(11)Slowly release the torque by turning the wrench in the stow direction until the torque wrench reads 0 lbf.in. (0 m.daN).
(12)Install the cover for the LAA manual drive pad and secure the cover with the two retaining bolts. TORQUE the bolts to between 32 and 35 lbf.in. (0.36 and 0.43 m.daN).
(13)Manually unlock the LAA as follows (Ref. Fig. 204).
(a)Push the two buttons located on the LAA manual release lever.
(b)Pull up the release lever away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(14)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad.
(15)Manually turn the CDU to move the translating cowl forward into the stow rig position.
(16)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position. The rig pin must engage easily, and the button must depress into the groove on the ballscrew as seen through the observation hole.
(17)Push the manual brake release lever on the CDU into its retaining clip to engage the cone brake.
(18)Manually lock the LAA as follows (Ref. Fig. 204).
(a)Push the two buttons located on the LAA manual release lever.
(b)Push down the release lever toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(19)Install the lockout cover (spline outside) for the CDU manual drive pad and secure the lockout cover with the two retained bolts. TORQUE the bolts to 35 +/- 3 lbf.in. (0.39 +/- 0.03 m.daN).
(20)Repeat steps (2) through (19) for the other fan reverser half.
(21)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

G. Check the Manual Deploy and Stow of the Thrust Reverser with the Locking Actuator Assembly (LAA) Installed

WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL. MAKE SURE THAT, DURING JOB SET-UP, THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, APU, OR ANOTHER ENGINE.

(1)Open, safety, and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF ACCIDENTAL THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THAT THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW PRIOR TO MANUAL OPERATION OF THE FAN REVERSER.

(2)For either fan reverser half, remove the two bolts that secure the lockout cover to the Center Drive Unit (CDU) manual drive pad and remove the lockout cover. Keep the removed bolts and lockout cover for assembly.

(3)Pull the manual brake release lever on the CDU to release the cone brake.
NOTE : The brake is released when the manual brake release lever is at an angle of approximately 60 degrees with the CDU body. The lever will move into a detent that can be felt. In all other positions, the brake will not be released.
(4)Manually unlock the LAA as follows (Ref. Fig. 204).
(a)Push in the two buttons located on the LAA manual release lever.
(b)Pull up the release lever away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(5)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad.
(6)Manually turn the CDU to move the translating cowl 0.5 in. (12.7 mm) in the deploy direction.
(7)Do a visual check to make sure that the amber REV UNLK indicator light comes on in the flight compartment. If the REV UNLK indicator light does not come on, refer to the Troubleshooting Manual.
(8)Install a 0.25 in. (6.4 mm) square drive into the CDU manual drive pad.
(9)Manually turn the CDU to move the translating cowl forward into the stow rig position.
(10)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position. The rig pin must engage easily, and the button must depress into the groove on the ballscrew as seen through the observation hole.
(11)If the CDU is not at the stow rig position, check the CDU stow adjustments (Ref. 78-31-00, P. Block 501).
(12)Push the manual brake release lever on the CDU into its retaining clip to engage the cone brake.
(13)Manually lock the LAA as follows (Ref. Fig. 204).
(a)Push the two buttons located on the LAA manual release lever.
(b)Push down the release lever toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(14)Install the lockout cover (spline outside) for the CDU manual drive pad and secure the lockout cover with the two retained bolts. TORQUE the bolts to 35 +/- 3 lbf.in. (0.39 +/- 0.03 m.daN).
(15)Repeat steps (2) through (14) for the other fan reverser half.
(16)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).
(17)Remove the safety clips and tags, and close the previously opened circuit breakers.

THRUST REVERSER SYSTEM - ADJUSTMENT/TEST

1. General

A properly rigged/adjusted fan reverser is essential not only to reverser performance, but also to engine performance in the forward thrust range. Proper rigging of the reverser actuation system minimizes dynamic friction (parts wear) by alignment of the translating cowls to the fixed structure guide tracks and thereby assuring minimum deploy/stow actuation times. Also with alignment of the translating cowls, the fan exit nozzle area is set as well as ensuring proper seal engagement to provide optimum engine performance in forward thrust. Further, proper rigging more evenly distributes loads between the actuation components which increases their service life and precludes center drive unit (CDU) stow lockup.

Anytime an end gearbox, end actuator, flex shaft, or CDU is removed/replaced, the reverser should be rerigged prior to any operation. Observe the following during the rigging procedure.

CAUTION : DURING RIGGING, THE REVERSER HALVES SHOULD BE CLOSED AND LATCHED. IF A PNEUMATIC WRENCH IS USED TO DEPLOY/STOW THE TRANSCOWL, OBSERVE THE FEEDBACK STOP ROD FOR MOTION WHEN APPROACHING FULL DEPLOY/STOW. WHEN MOTION IS DETECTED, REMOVE THE PNEUMATIC WRENCH AND COMPLETE THE CYCLE USING A MANUAL SPEED WRENCH. THIS PREVENTS LOCKUP OF THE CDU FROM EXCESSIVE TORQUE WHEN STOPS ARE ENGAGED. NEVER OPERATE THE REVERSERS USING APU OR GROUND CART AIR UNTIL ALL RIGGING HAS BEEN SATISFACTORILY COMPLETED.

NOTE : It is acceptable to use a fixed-length (Post SB 78-152) upper or lower angle gearbox and an adjustable-length (Pre SB 78-152) upper or lower angle gearbox on the same thrust reverser half if you use the correct procedure to set the translating cowl stow gap.

**ON A/C 001-100,

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. 2C6367	Tool, Install/Remove - Pin, Fan Reverser Actuator
C. 491B1200075-001	Shim
D.	Air Supply Ground Power Unit
R E. MS9489-12	Aircraft Bolts
F. AN806-16	Plugs
G. Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 23-44-00, P. Block 501	Cabin and Service Interphone
- 24-41-00, P. Block 301	AC External Power
- 36-00-00, P. Block 1	Pneumatic - General
- 49-00-00, P. Block 501	APU - General

ITEM	DESIGNATION
- 71-13-00, P. Block 301	Cowl Doors
- 76-11-41, P. Block 401	Flexible Control
- 78-31-01, P. Block 401	Pneumatic Drive Unit
- 78-31-02, P. Block 401	Center Gearbox and Ballscrew Actuator
- 78-31-12, P. Block 401	Thrust Reverser Flexible Shaft
- 78-31-51, P. Block 401	Locking Actuator Assembly

**ON A/C 001-100,

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Adjustment/Test
(1)Thrust reverser rigging procedure.
The rigging procedure as described in the following text consists of various sub-tasks that all tie together to ensure a properly rigged actuation system. The text will only address rigging one reverser half as the procedure is identical for the other half and either half can be rigged independent of the other. However, if an actuation component is removed/replaced on both halves, the rigging procedure must be accomplished on both sides.
(a)Stowing the center drive unit.
1 Manually release the CDU brake by positioning the manual brake release lever at the detent angle of approximately 60° (until a flat is felt) with the body of the CDU. In any other position the brake will be applied.
2 Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).
a Push in the two buttons located on the LAA manual release lever.
b Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
3 Remove the two bolts securing the lockout plate to the CDU and remove the lockout plate.
4 Install a 0.25 in. (6.4 mm) square drive speed handle into the auxiliary drive pad and hand crank the CDU to drive the transcowl to the "near stow" position as evidenced by the feedback stop rod beginning to move forward and stop at this point. Do not exceed 10 lbf.in. (0.113 m.daN) running torque to drive the CDU. If 10 lbf.in. (0.113 m.daN) running torque is exceeded, remove the throttle feedback cable from the CDU and recheck torque. If torque is less than

9.0 lbf.in. (0.10 m.daN), repair or replace throttle feedback cable (Ref. 76-11-41, P. Block 401). If torque is greater than 9.0 lbf.in. (0.10 m.daN) with throttle feedback cable removed from the CDU, refer to Paragraph 3.B.(5) and correct condition before proceeding.

5 Open the quick release clamps holding the flex shafts and remove flex shafts from the clamps.

6 At the CDU, remove the four bolts securing the flex shafts to the CDU and disengage the flex shafts from the CDU.

NOTE : Exercise care to prevent the core of the upper flex shaft from sliding out of the housing.
from sliding out of the housing.

7 Apply and hold finger pressure on the stow "rig indicator" button. (Ref. Fig. 501)

8 Do not exceed 15 lbf.in. (0.17 m.daN) and continue to slowly drive the CDU toward stow. If stow torque at or near stow exceeds 15 lbf.in. (0.17 m.daN) check transcowl bumper gap per Paragraph 3.B.(5) and correct condition before proceeding to the next step.

CAUTION : MAKE SURE THE INDICATOR-BUTTON PLUNGER IS FULLY INTO THE GROOVE OF THE EXTENSION TUBE FLANGE. AN INCORRECT ADJUSTMENT CAN CAUSE DAMAGE TO THE CENTER DRIVE UNIT.

9 Stop driving the CDU when the "rig indicator" button moves further inward and then begins to move back outward. Reverse direction with the speed handle to slowly drive the CDU back toward deploy to locate the bottom motion of the "rig indicator" button which locates the stow rig position. To further verify that the stow rig position is attained, use the inspection window in the CDU housing and observe that the "rig indicator" plunger is physically seated in the groove of the extension tube flange as shown (Ref. Fig. 501).

10 Return manual brake release lever to normal secured position which applies the CDU brake to hold the CDU at the stow rig position.

**ON A/C 001-100,

(b)Measure the transcowl gap at the CDU and verify that the bumpers are adjusted correctly.

1 Measure and record gap between the support ring and the forward edge of the transcowl at the centerline of the CDU actuator rod. (Ref. Fig. 503)

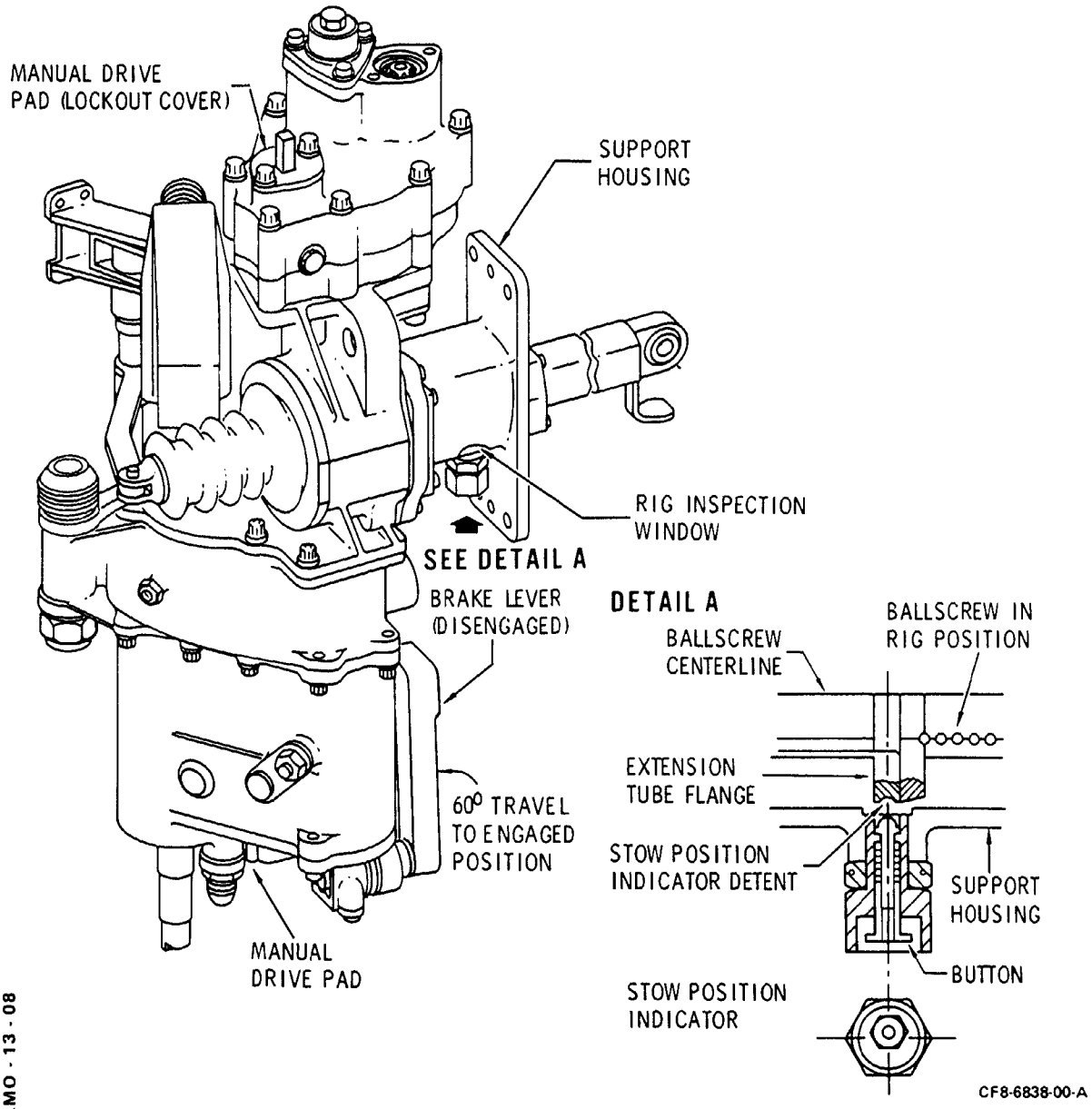
2 No adjustment is required if the gap measurement is between 0.060 and 0.150 in. (1.5 and 3.8 mm). If not within tolerance, adjust per Paragraph 3.B.(2) before proceeding on.

3 Check the eight transcowl bumpers and adjust if necessary. Refer to steps 3.B.(5)(b) through 3.B.(5)(b)16.

(c)Measure transcowl stowed gap at upper and lower angle gearboxes.

1 Remove the two bolts securing the cover onto the unused drive pads at both the upper and lower angle gearboxes and remove the covers. (Ref. Fig. 503)

2 Insert a 0.20 in. (5.1 mm) square drive into the unused drive at the upper angle gearbox and apply torque to hold the gearbox on the stow stop. Maximum torque required to hold the gearbox on the stow stop is 12 lbf.in. (0.136 m.daN). If torque exceeds maximum limit, check



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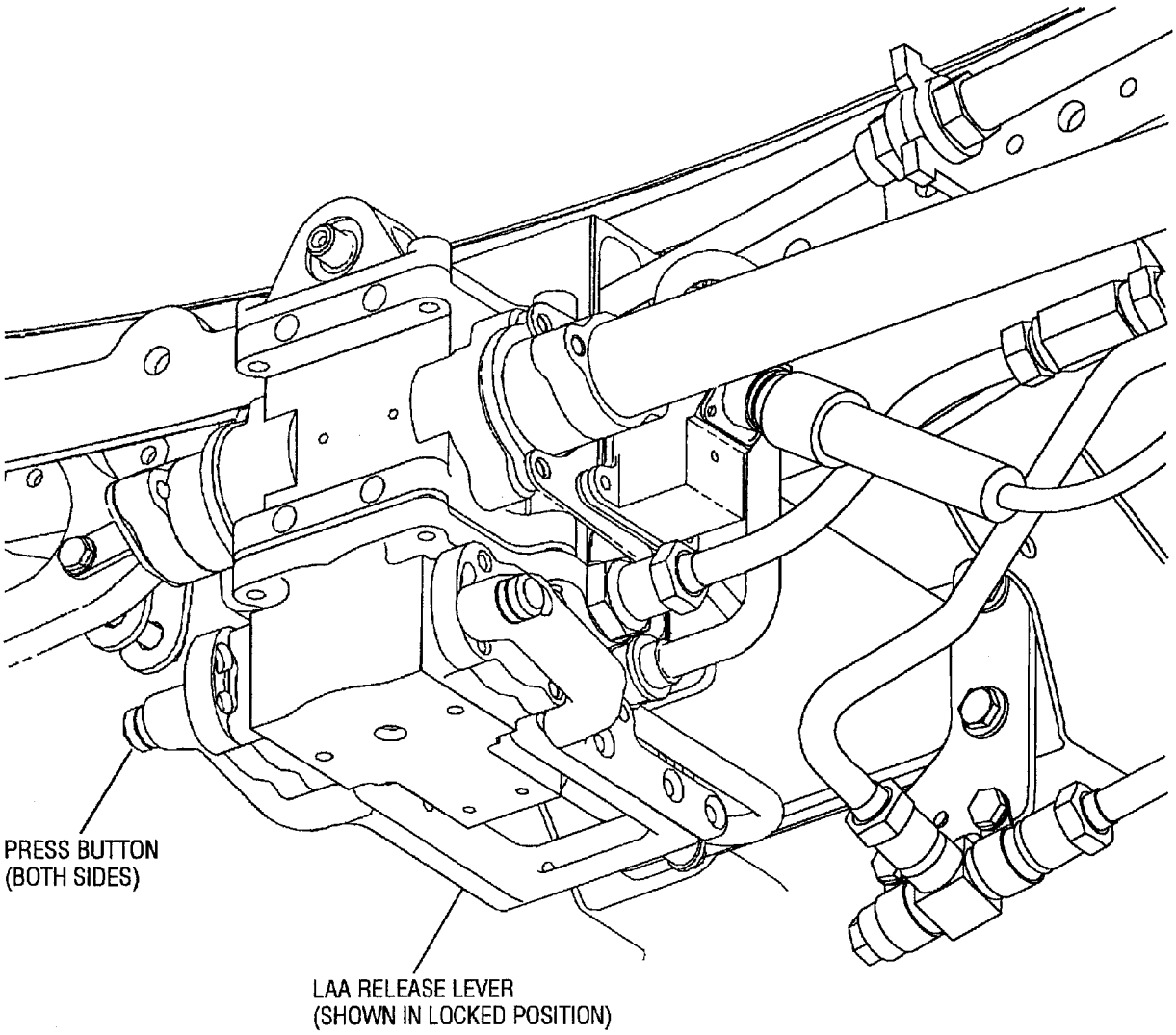
Center Drive Unit Rigging
Figure 501



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Locking Actuator Assembly Lock Release Lever
Figure 502

transcowl bumper gap per Paragraph 3.B.(5) and correct as necessary before proceeding on.

3 With stow torque applied to hold the upper angle gearbox on the stow stop, measure and record the stowed gap between the support ring and the forward edge of the transcowl at the centerline of the ballscrew actuator.

4 No adjustment is required if the stowed gap is between 0.060 and 0.150 in. (1.5 and 3.8 mm) and within ± 0.031 in. (0.785 mm) of the stowed gap of the CDU recorded in Paragraph 3.B.(2).(c).1. above. If limit is exceeded, adjust stowed gap per Paragraph 3.B.(3) before proceeding on.

5 Repeat above steps 2, 3, and 4 for lower angle gearbox.

**ON A/C 001-100,

R (d)Rigging upper and lower locking actuator assemblies (LAAs) to the CDU.

1 Verify that the CDU is in the stow rig position with the CDU brake applied as previously accomplished per Paragraphs 3.B.(1).(a).8 and 3.B.(1).(a).9 of this section.

2 Insert a 0.20 in. (5.1 mm) square drive into the unused drive on the
R upper locking actuator assembly (LAA) and apply torque to hold and
R maintain the LAA on the stow stop.

CAUTION : DO NOT ROTATE FLEXSHAFT SPLINE MORE THAN ONE SPLINE TOOTH IN THE DEPLOY DIRECTION (AS INDICATED BY DEPLOY ARROW ON CDU) TO ALLOW INSERTION INTO THE CDU. DO NOT ROTATE FLEXSHAFT IN STOW DIRECTION.

R 3 With the LAA held against the stow stop, try to insert the flexshaft spline into the CDU drive pad. If the splines do not align, the flexshaft may be rotated one spline tooth in the deploy direction to allow insertion into the CDU.

R 4 Repeat above steps 2 and 3 for lower LAA.

5 Secure upper and lower flex shafts to CDU with attaching bolts and
R TORQUE to between 24 and 27 lbf.in.(0.27 and 0.31 m.daN).

6 Reinstall cover plates on unused drive pads of the upper and lower
R locking actuator assemblies (LAAs). TORQUE bolts to between 24 and 27 lbf.in. (0.27 and 0.31 m.daN).

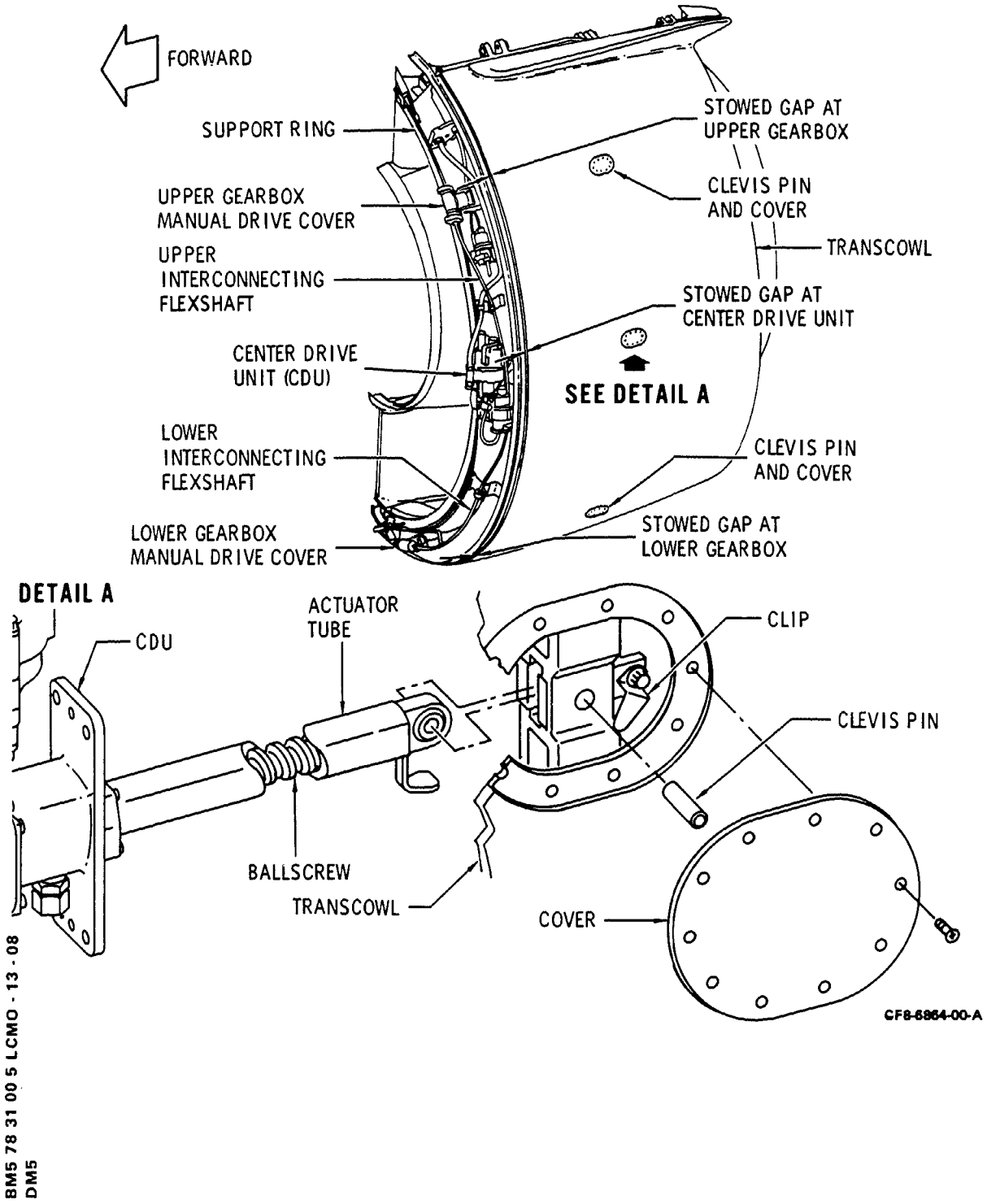
7 Reinstall upper and lower flex shafts into quick release clamps and secure.

8 Release the CDU brake and using a speed handle, hand crank the transcowl to full deploy and then back to stow. Use "rig indicator" button to determine stow position. Return manual brake release handle to normal applied position and secure.

9 Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).

a Push in the two buttons located on the LAA manual release lever.

b Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.



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Transcowl Stowed Gap Measurement
Figure 503

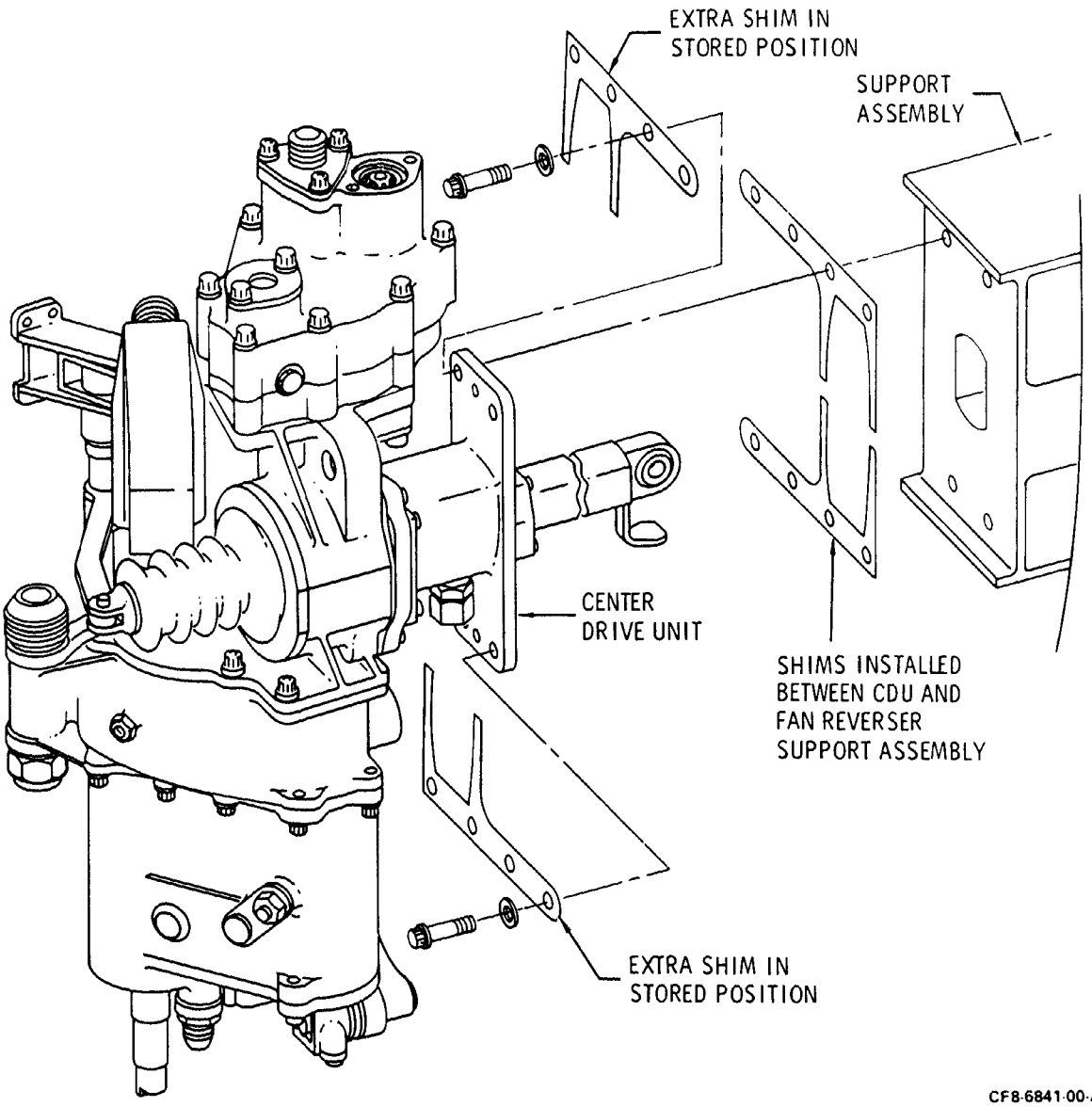
10 If transcowl clevis pin cover plates were removed during an adjustment procedure, reinstall cover plates and TORQUE screws to between 24 and 27 lbf.in. (0.27 and 0.31 m.daN).
11 Functionally test the reverser system per Paragraph 3.B.(8).

**ON A/C 001-100,

(2)Adjustment of transcowl stow gap at the CDU
If the gap between the leading edge of the transcowl and the support ring is not between 0.060 and 0.150 in. (1.5 and 3.8 mm) proceed as follows :
(a)Transcowl gap less than 0.060 in. (1.5 mm).
1 Manually release the CDU brake per Paragraph 3.B.(1).(a).1.
2 Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).
a Push in the two buttons located on the LAA manual release lever.
b Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
3 Remove the four bolts securing the CDU to the fixed structure and remove one upper and one lower shim (one shim thickness) from between the CDU and the fixed structure. (Ref. Fig. 504)
NOTE : It may be necessary to slightly deploy the CDU to free the shims.
4 Store the removed shims under the heads of the CDU attachment bolts (Ref. Fig. 504) and reinstall bolts to secure CDU to fixed structure. TORQUE bolts to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).
5 Rig actuation system per Paragraph 3.B.(1).
(b)Transcowl gap larger than 0.150 in. (3.8 mm).
1 Manually release the CDU brake per Paragraph 3.B.(1).(a).1.
2 Remove the four bolts securing the CDU to the fixed structure and transfer one upper shim and one lower shim from under the heads of the bolts.
3 Place one upper and one lower shim (one additional shim thickness) between the CDU and the fixed structure. Reinstall CDU attaching bolts and TORQUE to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).
NOTE : It may be necessary to slightly deploy the CDU in order to install shims between the CDU and the fixed structure.
4 Rig actuation system per Paragraph 3.B.(1).

**ON A/C 001-100,

Pre SB GE 78-152
R (3)Adjustment of transcowl stow gap at upper or lower locking actuator
R assemblies (LAA).
If the gap between the leading edge of the transcowl and the support



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CDU Shim Installation
Figure 504

R ring at either upper or lower LAA is not between 0.060 and 0.150 in. (1.5 and 3.8 mm) and is not within ± 0.031 in. (0.785 mm) of the CDU stowed gap measurement, proceed as follows :

NOTE : It is acceptable to use a fixed-length (Post SB 78-152) upper or
R lower LAA and an adjustable-length (Pre SB 78-152) upper
R or lower LAA on the same thrust reverser half if you use the correct procedure to set the translating cowl stow gap.

R (a)Attain required gap by adjusting the rod end bearing of the locking actuator associated with the incorrect gap by using the following
R procedure. Both upper or lower locking actuators are adjusted in the same manner.

1 Manually release the CDU brake per Paragraph 3.B.(1).(a).1.

2 Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).

a Push in the two buttons located on the LAA manual release lever.

b Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

R 3 Temporarily insert the flex shaft of the locking actuator not requiring adjustment into the CDU drive pad.

R 4 At the locking actuator requiring adjustment, remove the screws securing the clevis pin cover plate to the transcowl and remove the cover plate.

CAUTION : DO NOT REMOVE CLEVIS PIN RETAINING CLIP BOLT. BACK BOLT OUT ENOUGH TO ROTATE RETAINING CLIP. REMOVAL OF BOLT WILL DAMAGE NUT PLATE.

5 Loosen bolt securing retaining clip and rotate clip 90°.

R 6 Using puller 2C6367, remove the clevis pin attaching the locking actuator to the transcowl.

7 Manually deploy the transcowl by using a 0.25 in. (6.4 mm) square drive to drive the CDU at the auxiliary drive pad until the rod end
R bearing of the locking actuator to be adjusted is accessible.

CAUTION : AFTER ADJUSTMENT OF ROD END BEARING(S), ENSURE THAT A 0.055 IN. (1.4 MM) DIAMETER PIN WILL NOT PASS THROUGH WITNESS HOLE.

8 Remove lockwire and loosen the rod-end jam nut ensuring that the rod end does not rotate accidentally. Adjust the rod end bearing as required to bring stow gap within specified limits. One turn of rod end equals approximately 0.042 in. (1.07 mm) (Ref. Fig. 505) for adjustment direction.

Pre MRAS SB 78-1028

9 After the completion of the rod-end adjustment, tighten the jam nut. Do not let the rod-end turn while you tighten the jam nut. TORQUE the jam nut to between 180 and 220 lbf.in. (2.03 and 2.48 m.daN) and wirelock.

End Pre MRAS SB 78-1028

Post MRAS SB 78-1028

9 After the completion of the rod-end adjustment, tighten the jam nut. Do not let the rod-end turn while you tighten the jam nut. TORQUE the jam nut to between 500 and 520 lbf.in. (5.65 and 5.88 m.daN) and wirelock.

End Post MRAS SB 78-1028

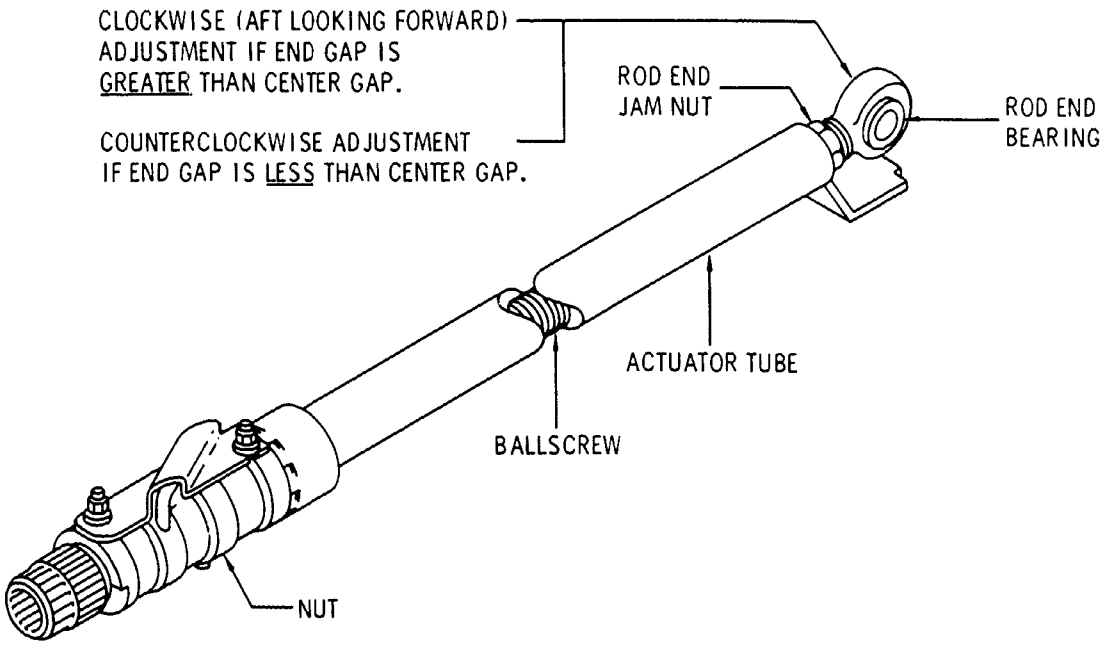
R 10 Manually deploy the adjusted locking actuator by inserting a 0.20 in. (5.1 mm) square drive into the gearbox unused drive pad.
R Hold the locking actuator tube to prevent rotation and carefully guide the rod end into the transcowl clevis.
11 Using the pusher/puller 2C6367, insert the clevis pin into the transcowl to secure the rod end.
12 Temporarily install the flex shafts into the CDU and rig the actuation system per Paragraph 3.B.(1).

End Pre SB GE 78-152

**ON A/C 001-100,

Post SB GE 78-152

R (4)Adjustment of transcowl stow gap at upper or lower locking actuator
R assembly (LAA).
If the gap between the leading edge of the transcowl and the support
R ring at either upper or lower LAA is not between 0.06 and 0.15 in. (1.5 and 3.8 mm) and is not within ± 0.031 in. (0.78 mm) of the CDU stowed gap measurement, proceed as follows :
NOTE : It is acceptable to use a fixed-length (Post SB 78-152) upper or
R lower LAA and an adjustable-length (Pre SB 78-152) upper
R or lower LAA on the same thrust reverser half if you use the correct procedure to set the translating cowl stow gap.
(a)If the transcowl stow gap is less than 0.06 in. (1.5 mm) :
1 Manually release the CDU brake per Paragraph 3.B.(1)(a)1.
2 Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).
a Push in the two buttons located on the LAA manual release lever.
b Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
3 Remove the four bolts that attach the actuator mount bracket to the support assembly.
4 Remove the shim(s) from between the bracket and the support assembly to obtain a stow gap between 0.06 and 0.15 in. (1.5 and 3.8 mm).
5 Install the four bolts that attach the bracket to the support assembly. TORQUE the bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
6 Remove the two bolts that attach the shim(s) to the left torque box assembly near the nameplate (Ref. Fig. 506).
7 Store the removed shim(s) on the left torque box assembly and secure with the two bolts.
(b)If the transcowl stow gap is more than 0.15 in. (3.8 mm) :
1 Manually release the CDU brake per Paragraph 3.B.(1)(a)1.
2 Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).



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Ballscrew Actuator Adjustment
Figure 505

a Push in the two buttons located on the LAA manual release lever.
b Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

3 Remove the four bolts that attach the actuator mount bracket to the support assembly.
4 Remove the two bolts that attach the shim(s) to the left torque box assembly near the nameplate (Ref. Fig. 506).
5 Add the shim(s) between the mount bracket and the support assembly to obtain a stow gap between 0.06 and 0.15 in. (1.5 and 3.8 mm).
6 Install the four bolts that attach the bracket to the support assembly. TORQUE the bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
7 Store the remaining shim(s) on the left torque box assembly and secure with the two bolts.

(c)If the angle gearbox transcowl stow gap is different from the transcowl stow gap at the CDU by more than 0.031 in. (0.78 mm), do one of the steps that follow:

1 If the angle gearbox transcowl stow gap is larger than the transcowl stow gap at the CDU by more than 0.031 in. (0.78 mm), install the shim(s) to make the difference less than 0.031 in. (0.78 mm).
NOTE : The shims are laminated. If minor adjustments are necessary, you can peel the shims in increments of 0.003 in. (0.07 mm).
2 If the angle gearbox transcowl stow gap is smaller than the transcowl stow gap at the CDU by more than 0.031 in. (0.78 mm), remove the shim(s) to make the difference less than 0.031 in. (0.78 mm).
NOTE : The shims are laminated. If minor adjustments are necessary, you can peel the shims in increments of 0.003 in. (0.07 mm).

(d)Temporarily install the flex shafts into the CDU and rig the actuation system per paragraph 3.B.(1).

End Post SB GE 78-152

**ON A/C 001-100,

(5)Excessive stow torque at or near the stow stops

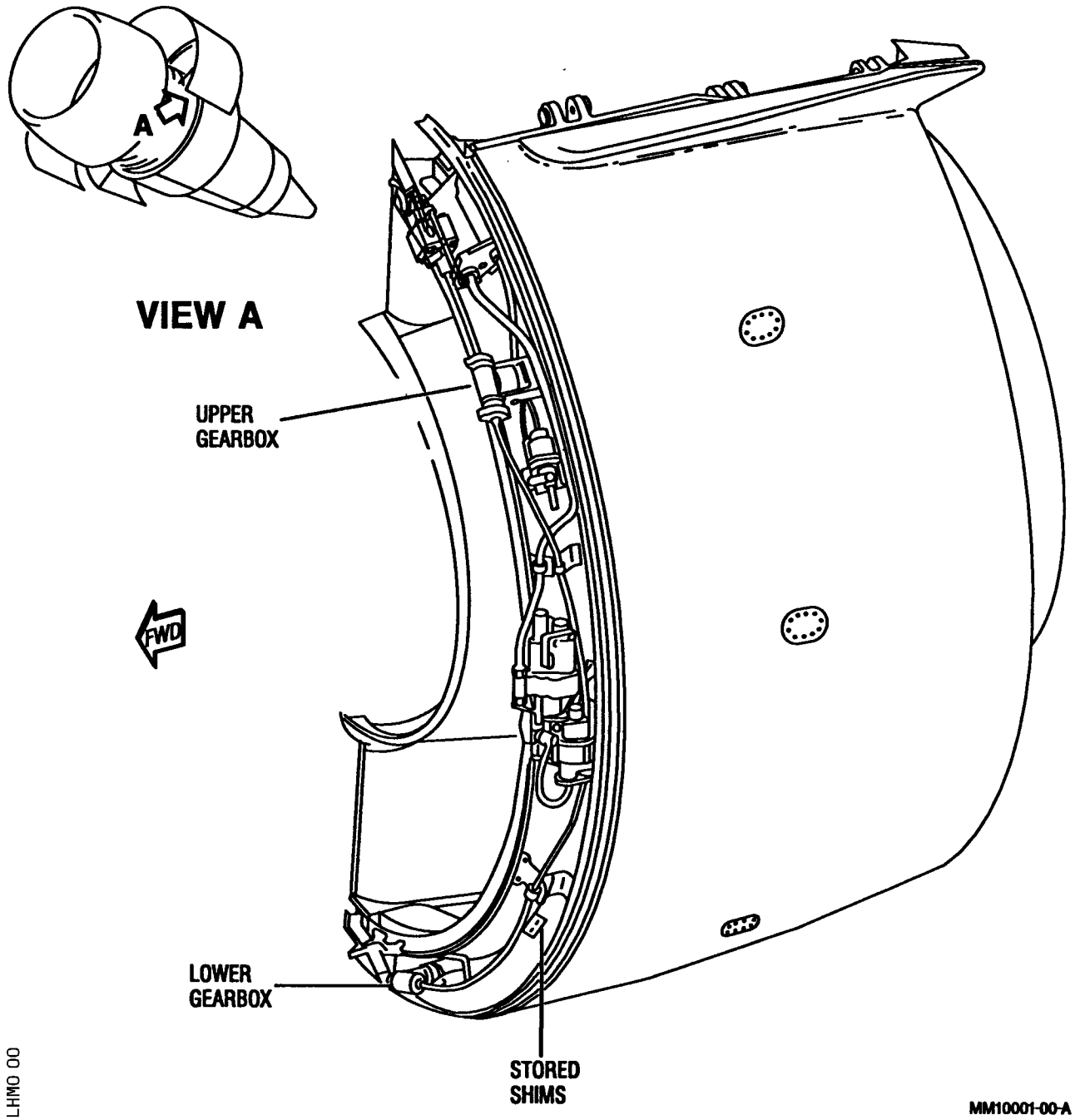
If the torque required to stow the reverser exceeds 15 lbf.in. (0.17
R m.daN) at the CDU or 12.0 lbf.in. (0.14 m.daN) at the upper/lower locking
R actuator assemblies (LAAs), proceed as follows :

(a)Torque limits exceeded and transcowl stow gap not within limits.

1 Adjust transcowl stow gap as required per Paragraphs 3.B.(2) and 3.B.(3).
2 Rig actuation system per Paragraph 3.B.(1).
3 If stow torque is not within limits, accomplish the following.

(b)Torque limits exceeded and transcowl stow gap is within limits.

1 Manually release the CDU brake per Paragraph 3.B.(1).(a).1.
2 Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).
a Push in the two buttons located on the LAA manual release lever.



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Location of Stored Shims for Upper and Lower Gearboxes with Fixed - Length Ballscrew Actuators
Figure 506

b Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

3 Temporarily insert the flex shafts into the CDU drive pads.

4 Using a 0.25 in. (6.4 mm) square drive speed handle at the CDU auxiliary drive pad, hand crank the transcowl toward deploy approximately 6-8 in. (152-203 mm).

5 Measure the bumper extension of all eight bumpers on the transcowl being rigged. (Ref. Fig. 507)

6 If the bumpers measure 0.70 in. (17.78 mm) or less, no adjustment is required. Replace any bumpers measuring more than 0.70 in. (17.78 mm) or trim the forward edge of the bumper(s) to achieve extension between 0.66 and 0.70 in. (16.76 and 17.78 mm).

7 Manually drive the CDU to position the leading edge of the transcowl approximately 0.75 in. (19.1 mm) from the aft edge of the fixed structure.

NOTE : Steps that follow are for reversers without the torque box outer ring repair doubler installed.

8 If necessary, install the bumper shims as follows :

- Put a straight edge against the translating cowl outer surface. Let the straight edge have an overlap at the aft edge of the torque box.
- Measure the distance from the inner surface of the straight edge to the outer surface of the torque box. This is dimension D1.
  If dimension D1 is more than 0.045 in. (1.14 mm) install shims between the bumpers and the translating cowl. This will adjust the bumpers for the correct height when they engage the torque box.
- If necessary, install the bumper shims as follows :
  . Calculate the necessary shim tickness. Substract 0.045in. (1.14 mm) from the measured dimension D1.
  . If shims P/N 491B12000075-001 are used, divide the result by 0.022 in. (0.559 mm) and round the result up to the next whole number.
    The result is the number of shims needed.

CAUTION : THE SHIM MUST BE MADE FROM STAINLESS STEEL. SHIMS MADE FROM ALUMINUM WILL CAUSE CORROSION FROM THE GALVANIZED ACTIONS CAUSED BY DISSIMILAR MATERIALS.

  . If shims P/N 491B12000075-001 are not used, make the shims of the necessary thickness from stainless steel.

NOTE : If necessary because of shim thickness, the bumper installation bolts can be replaced with longer grip length bolts.

  . Install the shims between the translating cowl and the bumper. Install the nuts.

NOTE : When shims are installed, dimension D1 will not change. The shims are used to set correct bumper height when they engage the torque box.

  . TORQUE the nuts to between 24 and 27 lbf. in. (0.27 and 0.31 m.daN).

NOTE : Steps that follow are for reversers with the torque box outer ring repair doubler installed.

9 If necessary, install the bumper shims as follows :
- Put a straight edge against the translating cowl outer surface. Let the straight edge have an overlap at the aft edge of the torque box (Ref. Fig. 507).
- Measure the distance from the inner surface of the straight edge to the outer surface of the torque box. This is dimension D2.
If dimension D2 is more than 0.005 in. (0.127 mm) install shims between the bumpers and the translating cowl. This will adjust the bumpers for the correct height when they engage the torque box.
- If necessary, install the bumper shims as follows :
. Calculate the necessary shim tickness. Substract 0.005 in. (0.127 mm) from the measured dimension D2.
. If shims P/N 491B12000075-001 are used, divide the result by 0.022 in. (0.559 mm) and round the result up to the next whole number.
The result is the number of shims needed.

CAUTION : THE SHIM MUST BE MADE FROM STAINLESS STEEL. SHIMS MADE FROM ALUMINUM WILL CAUSE CORROSION FROM THE GALVANIZED ACTIONS CAUSED BY DISSIMILAR MATERIALS.

. If shims P/N 491B12000075-001 are not used, make the shims of the necessary thickness from stainless steel.

NOTE : If necessary because of shim thickness, the bumper installation bolts can be replaced with longer grip length bolts.

. Install the shims between the translating cowl and the bumper. Install the nuts.

NOTE : When shims are installed, dimension D2 will not change. The shims are used to set correct bumper height when they engage the torque box.

. TORQUE the nuts to between 24 and 27 lbf. in. (0.27 and 0.31 m.daN).

POST SB GE 78-003 * * * (Engine with laminated shim)

CAUTION : MAKE SURE THE INDICATOR-BUTTON PLUNGER IS FULLY INTO THE GROOVE OF THE EXTENSION TUBE FLANGE. AN INCORRECT ADJUSTMENT CAN CAUSE DAMAGE TO THE CENTER DRIVE UNIT.

10 Manually operate the CDU and move the translating cowl to the stowed position. Keep a light pressure on the indicator button.
When you feel the indicator button go into the detent groove, stop the operation. Look in the inspection window of the CDU.
Make sure the indicator-button plunger is fully into the groove of the extension tube flange (Ref. Fig. 501).

11 Measure the clearance between the bumper lockplate assembly and the torque box structure (Ref. Fig. 508). No adjustment is necessary if the measurement is between 0.100-0.120 in. (2.54-3-05 mm).

12 If the measurement is not between 0.100 and 0.120 in. (2.54 and 3.05 mm), remove or add shims so the bumper lockplate(s) and the torque box engage correctly.
- Remove the screws, washers and nuts that hold the bumper lockplate assembly to the translating cowl.
- Install one or more shims P/N 491B1613043-001 or shims

PN GS12D014C300C between the translating cowl and the bumper lock plate.
Peel sheets from one shim as required to get a gap of between 0.100 and 0.120 in. (2.54 and 3.05 mm), and apply a layer of epoxy resin primer (Material No. C03-005 or equivalent)(Ref. Fig. 508).
- If shims PN GS12D014C300C are to be installed :
  . Use a No. 12 drill bit to back-drill the trhee holes in the bumper lock plate through the shim.
  . Deburr the shims.
  . Apply a layer of epoxy resin primer (Material No. C03-005 or equivalent) to the hole edges.
- If shims PN 491B1613043-001 are to be installed coat the shim with epoxy resin primer (Material No. C03-005 or equivalent).

13 Install the shims with the screws, washers and nuts removed during disassembly. If necessary, the screws can be replaced with longer grip length screws to accommodate the shims.

14 Measure the clearance between the bumper lockplate and the torque box structure again. Make sure the measurement is between 0.100 and 0.120 in. (2.54 and 3.05 mm).

End Post MRAS SB 78-003.

15 Rig actuation system per Paragraph 3.B.(1).

**ON A/C 001-100,

(6)Excessive torque required to translate reverser in transient (away from stow stop)
If free running torque exceeds 10 lbf.in. (0.113 m.daN) with reverser in transient away from the stow stops, proceed as follows :

(a)Defective component isolation procedure.

1 Manually release the CDU brake per Paragraph 3.B.(1).(a).1.

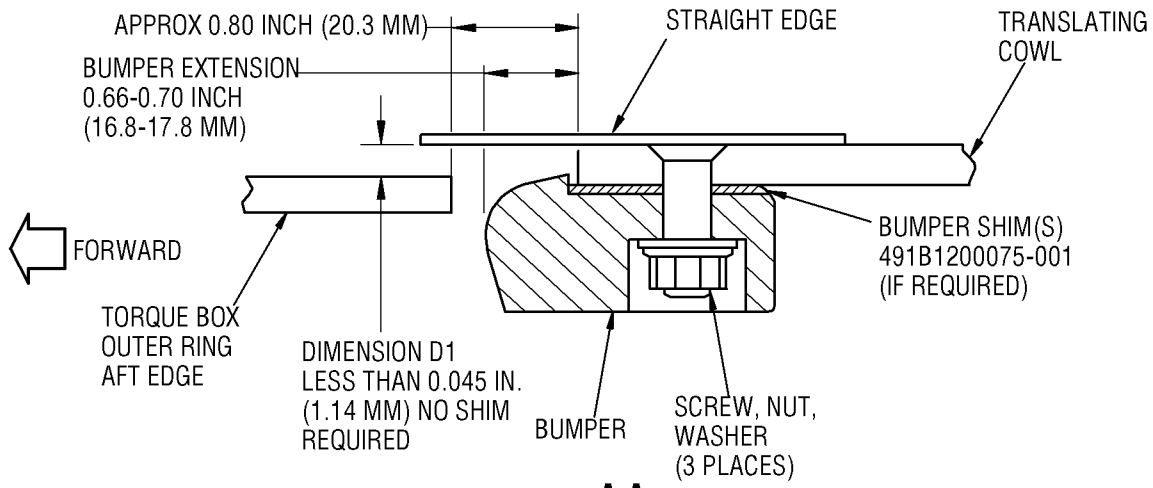
2 Temporarily insert the flex shafts into the CDU drive pads.

3 Measure the torque required to deploy and stow the transcowl by using a 0.250 in. (6.4 mm) square drive to drive the CDU through the auxiliary drive pad.
NOTE : Do not take torque readings at or near stow stops due to contact of transcowl bumpers to fixed structure causing increased torque requirements to drive system.

4 If torque exceeds 10 lbf.in. (0.113 m.daN) deploy the transcowl approximately 6.0 in. (152.4 mm). Disconnect both upper and lower flex shafts from the CDU. Remove the screws securing the cover plate on the transcowl to gain access to the CDU ballscrew actuator attachment clevis.
CAUTION : DO NOT REMOVE CLEVIS PIN RETAINING CLIP BOLT. BACK BOLT OUT ENOUGH TO ROTATE RETAINING CLIP. REMOVAL OF BOLT WILL DAMAGE NUT PLATE.

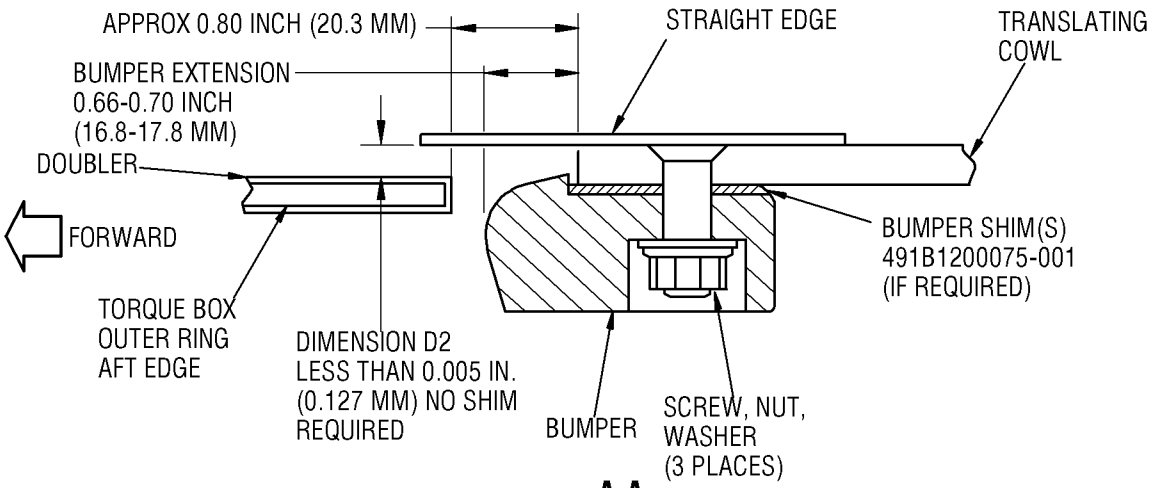
5 Loosen bolt securing retaining clip and rotate clip 90°.

6 Using puller tool 2C6367, remove clevis pin attaching the ballscrew actuator to the transcowl.



A-A

REVERSERS WITHOUT A TORQUE BOX OUTER RING DOUBLER REPAIR



A-A

REVERSERS WITH A TORQUE BOX OUTER RING DOUBLER REPAIR

NOTE: USE DIMENSION D1 FOR REVERSERS WITHOUT A REPAIR DOUBLER.
USE DIMENSION D2 FOR REVERSERS WITH A REPAIR DOUBLER.

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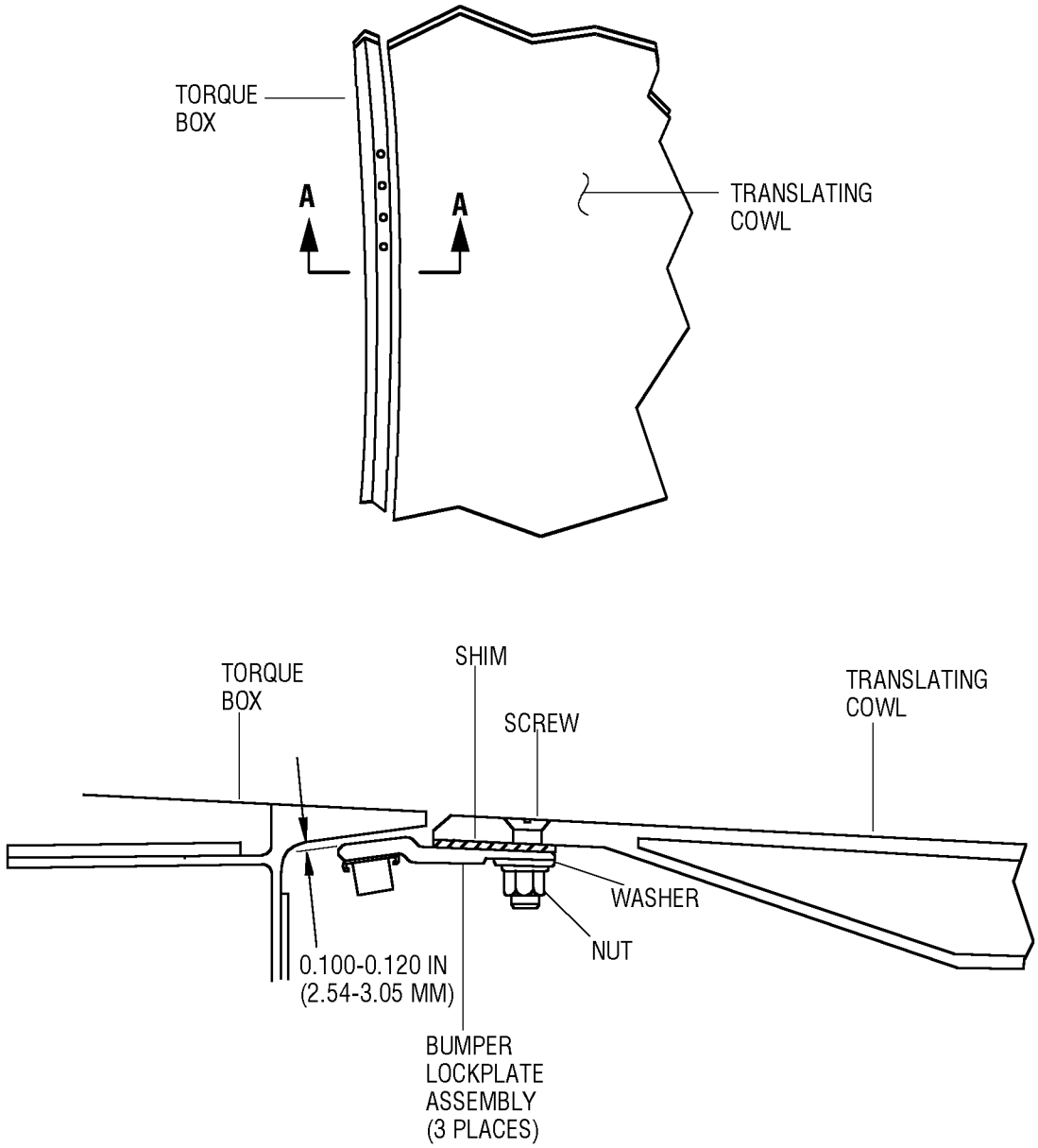
Bumper Extension and Radial Position
Figure 507



SECTION A-A

MR10195-00-A

BM5 78 31 00 5 LNM0 01

Bumper Lockplate Assembly Clearance Check
Figure 508

7 Measure the running torque required to drive the CDU through the auxiliary drive pad toward stow and deploy. Hold the CDU ballscrew actuator housing to prevent interference with the reverser structure. If torque exceeds 6.0 lbf.in. (0.675 N.m), replace the CDU. (Ref. 78-31-01, P. Block 401).

R 8 Remove bolts securing upper and lower flex shafts to the locking
R actuator assemblies (LAAs) and remove the screws securing the cover
R plates to gain access to the upper and lower locking actuator clevises.

CAUTION : DO NOT REMOVE CLEVIS PIN RETAINING CLIP BOLT. BACK BOLT OUT ENOUGH TO ROTATE RETAINING CLIP. REMOVAL OF BOLT WILL DAMAGE NUT PLATE.

9 Loosen bolt securing retaining clip and rotate clip 90°.

R 10 Using puller tool 2C6367, remove clevis pin attaching the locking actuator to the transcowl.

11 Measure the running torque required to drive the upper or lower
R LAAs by using a 0.20 in. (5.1 mm) square drive through the unused drive pad while holding the respective ballscrew actuator housing to prevent interference with the reverser structure.

R 12 If it is necessary to use more than 3.0 lbf.in. (0.034 m.daN) of torque to drive it toward stow or deploy, replace the defective gearbox (Ref. 78-31-12, P. Block 401).
R If it is necessary, to use more than 4.0 lbf.in. (0.045 m.daN) of torque to drive is toward stow or deploy, replace the defective locking actuator assembly (Ref. 78-31-51, P. Block 401).

13 Open the quick disconnect clamps securing the upper and lower flex shafts to the fixed structure and remove flex shafts from the reverser. Measure the torque required to turn each flex shaft and replace either if 1.0 lbf.in. (0.011 m.daN) is exceeded. (Ref. 78-31-12, P. Block 401).

R 14 Manually drive CDU and locking actuator assemblies to deploy individually to reconnect respective ballscrew actuator rod ends to
R the transcowl clevises. Hold the locking actuator housings to guide the rod ends into the transcowl clevises. Use pusher/puller 2C6367 to reinstall the clevis pins.

15 Position retaining clip over clevis pin and TORQUE bolt to between
R 55 and 70 lbf.in. (0.62 and 0.79 m.daN). Install lockwire (Material
R No. C10-071) through the head of the bolt and around the retaining
R clip.

16 Reinstall upper and lower flex shafts. (Ref. 78-31-12, P. Block 401).

17 Rig actuation system per Paragraph 3.B.(1).

**ON A/C 001-100,

(7)Freeing a locked up (jammed) center drive unit.
In the event a CDU locks up (jams) in the stow position, it is permissible to attempt to free up the unit and continue it in service.
(a)Perform the following procedure :
1 Manually release the CDU brake per Paragraph 3.B.(1).(a).1.
2 Using a calibrated torque wrench, apply a maximum torque of 130 lbf.

in. (1.467 m.daN) in the deploy direction through the 0.250 in. (6.4 mm) square drive of the CDU auxiliary drive pad. If the CDU will not free up and drive freely, replace CDU (Ref. 78-31-01, P. Block 401).

(8)Thrust reverser functional test.

After maintenance and for troubleshooting purposes, a functional test should be performed to verify proper operation of the complete reverser system.

(a)Perform functional test as follows :

1 Apply 115VAC electrical power to the aircraft (Ref. 24-41-00, P. Block 301).

2 Apply a source of regulated air at 28 ± 3 psi (1.93 ± 0.21 bars) to operate the fan reverser system using the aircraft APU or an external air cart source.

NOTE : An external pneumatic power source capable of providing a minimum of 20 psi. (138 kpa.) and an airflow of 210 standard cubic feet per minute (5.9 m3/mn) is required to properly operate reverser for testing.

WARNING : BEFORE CARRYING OUT ANY WORK ON THE FAN REVERSER SYSTEM, OR WHEN PERFORMING THE FAN REVERSER FUNCTIONAL TEST, MAKE CERTAIN THAT THE AREA IS CLEAR OF PERSONNEL BEFORE CONNECTING OR DISCONNECTING THE APU OR PNEUMATIC GROUND POWER UNIT, TO THE THRUST REVERSER GROUND TEST CONNECTION, TO PREVENT DEATH OR SERIOUS INJURY TO PERSONNEL.

CAUTION : BEFORE CONNECTING APU OR PNEUMATIC GROUND POWER UNIT TO THRUST REVERSER GROUND TEST POINT, MAKE CERTAIN THE AREA AROUND THE TRANSCOWLS ARE CLEAR TO DEPLOY.

3 With the engine throttles at idle, raise the reverse levers to the interlock position and observe that the "Unlock" lights illuminate signifying that the transcowls are in-transient to deploy. Within a maximum of three seconds, the "Reverse" light should illuminate and the "Unlock" light should go out signifying the reverser is at full deploy. At the same time, the throttle interlock should be released allowing the throttles to be moved to max reverse if desired.

4 Place the reverse levers down to the stow (forward thrust) position and observe that the "Reverser" light goes out and the "Unlock" light illuminates signifying the reverser is in-transient to stow. Within a maximum of five seconds, the "Unlock" light should go out signifying that the reverser is stowed and locked.

5 Any deviation from that described above should be investigated per Trouble Shooting Manual.

6 Repeat extension/retraction sequence 10 times while checking for any signs of abnormal operation.
Abnormal operation includes pneumatic leaks and indicator light malfunctions.

7 Remove electrical and pneumatic power from the aircraft (Ref. 24-41-00, P. Block 301).

**ON A/C 001-100,

(9)Thrust reverser pressure switch
(a)The thrust reverser pressure switch should be functionally tested after component replacement, system rigging or any associated maintenance.
1 Perform the following to test the pressure switch :
- Install the lock-out (deactivation) splines in both the right and left hand center drive units (CDU).
- With electrical and pneumatic sources available to the system, actuate the reversers and observe the reverse thrust operation lights. The amber light should illuminate.
NOTE : The levers should not be held in the actuated position (reverse thrust) for more than 1 second.
- If the amber light fails to illuminate, refer to the Trouble Shooting Manual.
- Remove lock-out splines, from the right and left center drive unit (CDU).
2 After removal of the lock-out spline, perform the following :
- Actuate the reverser system. Observe the unit for smoothness of operation, any evidence of binding and any unusual noises.
10)Center Drive Unit (CDU) position switch module functional test
(a)Do a functional test of the CDU position switch module after the limit switch to the CDU is installed.
1 After the limit switch is installed, do a functional test (this includes a continuity test of the pins for the electrical connector in the position switch module) at the extended and stow positions of the transcowl as follows :
- Release the manual LAA brake(s) so that the reverser can be extended.
- Manually turn the auxiliary drive pad on the CDU. This must be done slowly and in the direction to extend the reverser half.
- When the transcowl space is more than 0.300 in. (7.62 mm) the Reverser Unlock Light (amber in color) will come on in the cockpit as the pins touch. This dimension includes the usual transcowl rigged space. Pins 3 and 4 and pins 6 and 5 will touch at this point in time to make continuity.
- Continue to extend the transcowl. When the transcowl is extended to 0.500 in. (12.70 mm) from the fully extended position (22 in. [559 mm] plus the rigged space) the Reverser Unlock Light (amber in color) will go off. At the same time, the Reverser Light (green in color) will come on. Continuity will break between pins 7 and 8 and pins 2 and 9. At the same time, pins 1 and 8 and pins 9 and 10 will make continuity.
NOTE : The two transcowls must be in the extended position at the same time for the Reverser Light to come on.

**ON A/C 001-100,

(11)Put the translating cowl in the stow rig position.
(a)Manually move the translating cowl to the stowed position.
(b)Push the button on the CDU stow rig position indicator to make sure that the translating cowl is in the stow rig position. The rig pin must engage easily and the button must depress into the groove on the ballscrew as seen through the observation hole.
(12)Remove the square drive handle from the CDU socket.
(13)Install the lockout cover on the CDU manual drive pad and attach it with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(14)Engage the manual brake release lever on the CDU into its retaining clip.
(15)ManuallY lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502).
(a)Push in the two buttons located on the LAA manual release lever.
(b)Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(16)Close the thrust reverser cowl door(s) (Ref. 71-13-00, P. Block 301).
(17)Make sure the work area is clean and clear of tools and miscellaneous items of equipment.
(18)Close the fan cowl door(s) (Ref. 71-13-00, P. Block 301).
(19)Remove the safety clips and tags, and close the previously opened circuit breakers.

**ON A/C 001-100,

4. Thrust Reverser Functional and Indicating/Warning Sensors Test

A. Job Set-Up
WARNING : MAKE CERTAIN THAT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.
MAKE CERTAIN THAT THROUGHOUT THE JOB SET-UP, AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY A PNEUMATIC GROUND POWER, APU OR THE OTHER ENGINE.
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Connect interphone system between flight compartment and the appropriate engine area (Ref. 23-44-00, P. Block 501).
WARNING : IF ANY INSPECTION/MAINTENANCE IS TO BE PERFORMED WITH THE TRANSCOWL DEPLOYED, REMOVE AIR SUPPLY FROM REVERSER SYSTEM.
(4)Connect external pneumatic power source to the aircraft ground air connection (Ref. 36-00-00, P. Block 1) or APU (Ref. 49-00-00, P. Block 501).

CAUTION : BEFORE OPERATING THE REVERSER SYSTEM, ENSURE THAT THE TRANSCOWLS ARE CLEAR TO DEPLOY.

(5)Remove safety clips and tags.

B. Procedure - Stow and Deploy Switches Test

(1)Left sleeve

(a)Disconnect the following plugs :

1 Pressure switch (P1).

2 Right side stow and deploy switch (P3).

(b)Ground pin 10 of the removable plug (P3).

(c)Close circuit breakers 45KM (44KM) and 1KM (2KM).

(d)Test

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position	Check that : - REV UNLK warning light comes on when sleeves move from stowed position - REV UNLK warning light goes off and REV indicator light comes on when reversers reach the deploy position.
- Move thrust reverser control lever to reverser stowed position.	Check that : - REV indicator light goes off as translating sleeves move from the fully deployed position - REV UNLK warning light comes on when sleeves move to stowed position - REV UNLK warning light goes off when sleeves are fully stowed

(e)Open circuit breakers 45KM (44KM) and 1KM (2KM).

(f)Unground pin 10 of the removable plug (P3).

(g)Connect plugs (P3).

(2)Right sleeve

(a)Disconnect the following plug :

1 Left side stow and deploy switch (P4).

(b)Ground pin 10 of the removable plug (P4).

(c)Close circuit breakers 45KM (44KM) and 1KM (2KM).

(d)Test

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position	Check that : - REV UNLK warning light comes on when sleeves move from stowed position - REV UNLK warning light goes off and REV indicator light comes on

ACTION	RESULT
	when reversers reach the deploy position.
- Move thrust reverser control lever to reverser stowed position	Check that : - REV indicator light goes off as translating sleeves move from the fully deployed position - REV UNLK warning light comes on when sleeves move to stowed position - REV UNLK warning light goes off when sleeves are fully stowed.

(e)Open circuit breakers 45KM (44KM) and 1KM (2KM).
(f)Unground pin 10 of the removable plug (P4).
(g)Connect plugs (P1), (P4).

C. Pressure Switch Test
(1)Disconnect the directional pilot valve solenoid plug (P5).
(2)Close circuit breakers 45KM (44KM) and 1KM (2KM).
(3)Test

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position.	Check that : - REV UNLK warning light comes on, sleeves do not move.
- Move thrust reverser control lever to reverser stowed position.	- REV UNLK warning light goes off.

(4)Open circuit breakers 45KM (44KM) and 1KM (2KM).
(5)Connect plug (P5).
(6)Close circuit breakers 45KM (44KM) and 1KM (2KM).
(7)If required, landing gear ground function test has to be performed at this time (Ref. Para. 5.).

D. Procedure - Third Locks and Dual Relays Test
(1)Disconnect external pneumatic power source.
(2)On panel 133VU, open circuit breaker 45KM (44KM).
(3)Disconnect the third thrust reverser lock interface plug 2515VC (2516VC).
(4)Test.

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position	Check that : - There is no presence of 115VAC voltage between pin 3/GND and between pin 7/GND of the third

ACTION	RESULT
	thrust reverser lock interface plug 2515VC (2516VC).
- Move thrust reverser control lever to reverser stowed position	Check that : - There is no presence of 115VAC voltage between pin 3/GND and between pin 7/GND of the third thrust reverser lock interface plug 2515VC (2516VC).

(5)On panel 133VU, open circuit breaker 1KM (2KM).
(6)On panel 505VU (504VU), remove relay 51KM (50KM).
(7)On panel 133VU, close circuit breaker 45KM (44KM).
(8)On panel 133VU, close circuit breaker 1KM (2KM).
(9)Test.

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position	Check that : - RLY OK annunciator light on panel 505VU (504VU) is off.
- Move thrust reverser control lever to reverser stowed position	Check that : - There is 115VAC voltage only during 10 seconds (after setting T/R lever to reverser stowed position) between pin 3/GND and between pin 7/GND of the third thrust reverser lock interface plug 2515VC (2516VC). - RLY OK annunciator light on panel 505VU (504VU) is off.

(10)On panel 133VU, open circuit breaker 1KM (2KM).
(11)On panel 133VU, open circuit breaker 45KM (44KM).
(12)On panel 505VU (504VU), install relay 51KM (50KM).
(13)On panel 505VU (504VU), remove relay 55KM (56KM).
(14)On panel 133VU, close circuit breaker 45KM (44KM).
(15)On panel 133VU, close circuit breaker 1KM (2KM).
(16)Test.

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position	Check that : - RLY OK annunciator light on panel 505VU (504VU) is off.
- Move thrust reverser control lever to reverser stowed position	Check that : - There is 115VAC voltage only

ACTION	RESULT
	during 10 seconds (after setting T/R lever to reverser stowed position) between pin 3/GND and between pin 7/GND of the third thrust reverser lock interface plug 2515VC (2516VC). - RLY OK annunciator light on panel 505VU (504VU) is off.

(17)On panel 133VU, open circuit breaker 1KM (2KM).
(18)On panel 133VU, open circuit breaker 45KM (44KM).
(19)On panel 505VU (504VU), install relay 55KM (56KM).
(20)Connect the third thrust reverser lock interface plug 2515VC (2516VC).
(21)On panel 133VU, close circuit breaker 45KM (44KM).
(22)On panel 133VU, close circuit breaker 1KM (2KM).
(23)Connect external pneumatic power source.
(24)Test.

ACTION	RESULT
- Move thrust reverser control lever to deploy idle position	Check that : - REV UNLK warning light comes on when sleeves move from stowed position - REV UNLK warning light goes off and REV indicator lights comes on when reversers reach to deploy position - RLY OK annunciator light on panel 505VU (504VU) remains on. NOTE : Do not take account extinguishing of the RLY OK annunciator light during a period not exceeding 2 seconds.
- Move thrust reverser control lever to reverser stowed position	Check that : - REV indicator goes off as transalting sleeves move from the fully deployed position - REV UNLK warning light comes on when sleeves moved to stowed position - REV UNLK warning light goes off when sleeves are fully stowed - RLY OK annunciator light on panel 505VU (504VU) remains on. NOTE : Do not take account extinguishing of the RLY OK

ACTION	RESULT
	annunciator light during a period not exceeding 2 seconds.

E. Procedure - Thrust Levers Disagree Test

ACTION	RESULT
- Move ENGINE 1 throttle control lever to max. take off position.	
- Move ENGINE 2 thrust reverser control lever to deploy idle position.	Check that : - translating sleeves remain in stowed position.
- Move ENGINE 2 throttle control lever to max. take off position.	
- Move ENGINE 1 thrust reverser control lever to deploy idle position.	Check that : - translating sleeves remain in stowed position.

F. Close-Up
(1)Open, safety and tag circuit breakers 1KM (2KM) and 45KM (44KM).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)De-energize the aircraft electrical network and disconnect ground power unit (Ref. 24-41-00, P. Block 301).
(4)Disconnect external pneumatic power source from the aircraft ground air connection (Ref. 36-00-00, P. Block 1) or APU (Ref. 49-00-00, P. Block 501).
(5)Close fan cowl and thrust reverser doors (Ref. 71-13-00, P. Block 301).
(6)Remove safety clips and tags and close previously opened circuit breakers.

**ON A/C 001-100,

5. Landing Gear Ground Function Test

A. Job Set-Up
(1)Perform job set-up as required in the job set-up of Para. 4.
(2)Close circuit breakers 1KM (2KM).

B. Procedure - Landing Gear Ground Function Test

ACTION	RESULT
- On panel 133VU, open circuit breaker 1GB	

ACTION	RESULT
- Move thrust control lever to idle position - Move thrust reverser control lever to idle position	Check that : - Translating sleeves remain in stowed position - REV UNLK warning light remains off
- On panel 133VU, close circuit breaker 1GB	Check that : - REV UNLK warning light comes on and translating sleeves move from stowed position, up to the deployed position.

C. Close-Up
(1)Perform close-up as required in the close-up of Para. 4.

6. Not Applicable

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Post SB 78-2011 For A/C 001-100,

5. Landing Gear Ground Function Test (Dual Protection Configuration)

ACTION	RESULT
- Open the circuit breaker 1KM.	
- Move both thrust reverser control levers to the deploy idle position	Make sure that : - REV UNLK warning light does not come on. - The engine reverser stays closed.
- Move both thrust reverser control levers to the reverser stowed position.	
- Close the circuit breaker 1KM and open the circuit breaker 2KM.	
- Move the thrust reverser control levers to the deploy idle position	Make sure that : - REV UNLK warning light does not come on. - The engine reverser stays closed.
- Move both thrust reverser control levers to the reverser stowed position.	

ACTION	RESULT
- Close the circuit breaker 2KM.	

6. Directional Pilot Valve (DPV) Test

A. Job Set-Up
(1)Perform job set-up as required in the job set-up of Para. 4.

B. Do a check for grounding of the power supply wiring of the Directional Pilot Valve (DPV).
NOTE : This test is for the engine 1. For the engine 2, use the indications between parentheses.

ACTION	RESULT
- Disconnect plug P5	Make sure that pin 2 is grounded.
- Move the thrust reverser control lever to the deploy idle position	Do a check for 28VDC at pin 2.
- Open circuit breaker 1KM (2KM)	Make sure that pin 2 is grounded.
- Move the thrust reverser control lever to the reverser stowed position.	
- Connect plug P5 and close circuit breaker 1KM (2KM).	
- Close the fan cowl doors (Refer to AMM 71-13-00, P. Block 301).	
- Do the test for the engine 2.	

C. Close-Up
(1)Perform close-up as required in the close-up of Para. 4.

**ON A/C 001-100,

Post SB 78-2011 For A/C 001-100,

5. Landing Gear Ground Function Test (Dual Protection Configuration)
To do the landing gear ground function test, you need to use the following

circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	L/G PROX DET & RELAYS SYS2/FLT/GND	1GB	331/V52
133VU	L/G PROX DET & RELAYS SYS1/RELAYS & RETRACT CTL	2GB	332/U51
133VU	L/G PROX DET & RELAYS SYS1/FLT/GND	119GB	332/U52
132VU	F/O/PB/SPLY/PITOT	9DA	322/N67
22VU	PROBES HEAT/CAPT PITOT/SPLY	5DA	207/C24
22VU	PROBES HEAT/STBY/PITOT/SPLY	55DA	207/C28

ACTION	RESULT
- Close circuit breakers 1KM (2KM) and 45KM (44KM)	
- Open circuit breakers 9DA, 5DA and 55DA	
- On panel 133VU, open circuit breaker 1GB	
- Move thrust reverser control lever to deploy idle position	Check that : - Translating sleeves remain in stowed position - REV UNLK warning light remains off - REV indicator light remains off.
- Move thrust reverser control lever to reverser stowed position	Check that : - Translating sleeves remain in stowed position - REV UNLK warning light remains off - REV indicator light remains off.
- On panel 133VU, close circuit breaker 1GB	
- On panel 133VU, open circuit breakers 2GB and 119GB	
- Move thrust reverser control lever to deploy idle position	Check that : - Translating sleeves remain in stowed position - REV UNLK warning light remains off - REV indicator light remains off.
- Move thrust reverser control lever	Check that :

ACTION	RESULT
to reverser stowed position	- Translating sleeves remain in stowed position - REV UNLK warning light remains off - REV indicator light remains off.
- On panel 133VU, close circuit breakers 2GB and 119GB.	
- Close circuit breakers 9DA, 5DA and 55DA	

6. Directional Pilot Valve (DPV) Test

A. Job Set-Up
(1)Perform job set-up as required in the job set-up of Para. 4.

B. Do a check for grounding of the power supply wiring of the Directional Pilot Valve (DPV).
NOTE : This test is for the engine 1. For the engine 2, use the indications between parentheses.

ACTION	RESULT
- Disconnect plug P5	Make sure that pin 2 is grounded.
- Close circuit breakers 1KM (2KM) and 45KM (44KM)	
- Move the thrust reverser control lever to the deploy idle position	Do a check for 28VDC at pin 2.
- Open circuit breakers 1KM (2KM) and 45KM (44KM)	Make sure that pin 2 is grounded.
- Close circuit breakers 1KM (2KM) and 45KM (44KM)	
- Move the thrust reverser control lever to the reverser stowed position.	
- Open circuit breakers 1KM (2KM) and 45KM (44KM)	
- Connect plug P5 and close circuit breakers 1KM (2KM) and 45KM (44KM)	
- Close the fan cowl doors (Refer to	

ACTION	RESULT

AMM 71-13-00, P. Block 301).

- Do the test for the engine 2.

C. Close-Up
(1)Perform close-up as required in the close-up of Para. 4.

**ON A/C 001-100,

7. Translating Cowl Auto Re-Stow Function Check

A. Job Set-Up
WARNING : MAKE SURE THAT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE YOU START THE MAINTENANCE PROCEDURES.
INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.
WHEN YOU DO THE JOB SET-UP, MAKE SURE THAT THE AIRCRAFT PNEUMATIC SYSTEM IS NOT PRESSURIZED BY PNEUMATIC GROUND POWER, THE AUXILIARY POWER UNIT, OR THE OTHER ENGINE.
(1)Open, safety, and tag the appropriate circuit breakers.
(2)Open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(3)Connect the electrical ground power unit and energize the aircraft network (Ref. 24-41-00, P. Block 301).
(4)Connect the interphone system between the flight compartment and the appropriate engine area (Ref. 23-44-00, P. Block 501).

B. Procedure - Translating Cowl Auto Re-Stow Function Check
(1)Release the CDU brake by pulling the handle out away from the CDU (approximately 60°) until a flat is felt.
(2)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(3)Remove the two bolts that secure the lockout plate to the CDU, and remove the plate.
(4)Install a 0.25 in. (6.35 mm) square drive handle into the lockout spline. Crank the translating cowl in the deploy direction approximately 1.0 in. (25.4 mm).
(5)Return the brake handle to the locked position to engage the cone brake.
(6)Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 502)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Push the release lever down toward the LAA until the two buttons click

into position and you can see the green stripes on the buttons.

WARNING : IF ANY INSPECTION OR MAINTENANCE WILL BE PERFORMED WITH THE TRANSLATING COWL DEPLOYED, REMOVE THE AIR SUPPLY FROM THE THRUST REVERSER SYSTEM. WITH THE AIR SUPPLY CONNECTED, LOSS OF ELECTRICAL POWER CAN CAUSE THE THRUST REVERSER TO STOW. INADVERTENT STOW CAN RESULT IN DEATH OR SERIOUS INJURY. MAKE SURE THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT TO PREVENT INJURY OR DAMAGE IN CASE OF UNCOMMANDED THRUST REVERSER OPERATION.

CAUTION : MAKE SURE THE TRANSLATING COWLS ARE CLEAR TO DEPLOY AND STOW BEFORE YOU OPERATE THE THRUST REVERSER SYSTEM.

(7)Connect an external pneumatic power source to the aircraft ground air connection (Ref. 36-00-00, P. Block 1) or auxiliary power unit (APU) (Ref. 49-00-00, P. Block 501).

(8)Close the circuit breakers and check that the REV UNLK warning light comes on initially in the cockpit, and then goes off when the translating cowl automatically re-stows.

(a)If the REV UNLK warning light does not come on initially, refer to the Trouble Shooting Manual

(b)If the translating cowl does not re-stow automatically, refer to the Trouble Shooting Manual.

C. Close-Up

(1)Disconnect the external pneumatic power source from the aircraft ground air connection (Ref. 36-00-00, P. Block 1) or APU (Ref. 49-00-00, P. Block 501).

(2)Open, safety and tag the appropriate circuit breakers.

(3)De-energize the aircraft electrical network and disconnect the ground power unit (Ref. 24-41-00, P. Block 301).

(4)Disconnect the interphone system between the flight compartment and the appropriate engine area (Ref. 23-44-00, P. Block 501).

(5)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(6)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

(7)Remove the safety clips and tags. Close the previously opened circuit breakers.

(8)Remove the 0.25 in. (6.35 mm) square drive handle from the lockout spline.

(9)Install the lockout plate on the CDU with the two bolts.

(10)Make sure the translating cowl is in stow rig position. The translating cowl is in stow rig position when the CDU indicator pin is fully engaged in the stow position indicator detent.

NOTE : You can see the indicator pin through the rig inspection window on the CDU (Ref. Fig. 501).

**ON A/C 001-100,

8. Thrust Reverser Cycling Test (Engine Running)

WARNING : MAKE SURE THAT:

- THE TRAVEL RANGES OF THE THRUST REVERSERS OF THE ENGINE ARE CLEAR OF ALL TOOLS, EQUIPMENT AND PERSONS.
- THE THRUST REVERSERS ARE CLOSED AND LOCKED.
- THE THROTTLE CONTROL LEVER OF THE RELATED ENGINE IS IN THE IDLE POSITION.
- THE TEST IS PERFORMED IN A CLEAN AREA, I.E. POTENTIAL FOD WERE REMOVED.
- MAKE SURE THAT THE AIRCRAFT IS POINTED INTO THE WIND.

WARNING : YOU MUST MAKE SURE THAT THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONS AND EQUIPMENT BEFORE YOU OPERATE IT. THE THRUST REVERSER TRANSLATING DOORS MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE TO EQUIPMENT.

CAUTION : DO NOT OPERATE THE ENGINE IN REVERSE THRUST WITH THE FAN AND CORE COWL DOORS OPEN. IF THE DOORS ARE OPEN, DAMAGE TO THE ENGINE AND THE DOORS CAN OCCUR.

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General
- 72-00-00, P. Block 501	Engine - General

B. Job Set-Up

WARNING : BEFORE STARTING ONE OR BOTH ENGINES, ALL SAFETY AND OPERATING AIRCRAFT PRECAUTIONS MUST BE OBSERVED TO IMMOBILIZE AIRCRAFT (REF. 71-00-00, P. BLOCK 501).

NOTE : This test also pressurizes various systems at idle power to permit a thorough leak check of components replaced.

NOTE : Make sure that the engine 1(2) shutdown occured not less than 5 minutes before you do this procedure.

(1)Make sure that these circuit breakers are closed:

PANEL	DESIGNATION	FIN.	LOCATION
For ENG 1			
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG1/REVERSE/WARN	3KM	332/U68
133VU	ENGINES/ENG1/THRUST REVERSER LOCK	45KM	332/U67
133VU	ENGINES/IGNITION/ENG1&2/SYS A	1JH	334/S72
133VU	ENGINES/IGNITION/ENG1&2/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/FUEL HP VALVE/CTL	3KC	333/T69
For ENG 2			
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG2/REVERSE/WARN	4KM	331/V73
133VU	ENGINES/ENG2/THRUST REVERSER LOCK	44KM	331/V75
133VU	ENGINES/IGNITION/ENG1&2/SYS B	2JH	333/T72
133VU	ENGINES/ENG2/FUEL HP VALVE/CTL	4KC	333/T70

(2)Safety precautions (Ref. 71-00-00, P. Block 501).

C. Procedure

(1)Start the engine.

(a)Prepare, service and start engine as described in 71-00-00, P. Block 501.

(b)Allow N2 to stabilize at MINIMUM IDLE for 5 minutes.

(c)On right ECAM display unit (ENG page):

1 Check that operating indications are within the operating limits (Ref. 71-00-00, P. Block 501).

2 Check N1 vibration indication (Ref. 72-00-00, P. Block 501).

3 Check N2 vibration indication (Ref. 72-00-00, P. Block 501).

(2)Do a thrust reverser cycling test (engine running).

NOTE : During the different phases of the thrust reverser cycle, ensure that indicating is in accordance with Table 1. In order to make sure that the system operates properly, perform the thrust reverser cycling five (more) times as follows.

(a)Move the ENG 1(2) thrust reverser lever to the REVERSE IDLE hard point.

1 The translating cowl should deploy.

NOTE : The translating cowl should be deployed before five secondes.

2 In the flight compartment, the REV UNLOCK light must illuminate when the thrust reversers operate, and turn off when the thrust reversers are fully deployed, while the REV light shall illuminate.

3 EPR on ENG 1(2) shall increase.

(b)Move the ENG 1(2) thrust reverser throttle lever back to the forward idle stop.

1 The translating cowl should be stowed.

NOTE : The translating cowl should be stowed before four secondes.

2 In the flight compartment, the REV UNLOCK light must illuminate when the thrust reversers operate, and turn off when the thrust reversers are fully stowed.

Position	REV UNLOCK light	REV light
Stowed	OFF	OFF
In deployment	AMBER	OFF
Deployed	OFF	GREEN
Stowing	AMBER	OFF
Stowed	OFF	OFF

Flight Compartment Indicating
Table 1

D. Close-Up

(1)After test completion, shut down the engine (Ref. 71-00-00, P. Block 501).

(2)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(3)De-energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).

**ON A/C 001-100,

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THRUST REVERSER SYSTEM CONTROL - INSPECTION/CHECK

1. General

A. This inspection/check pertains to the inspection and check of thrust reverser system. General procedures to be followed during inspection/check are as follows :

(1) A functional test is required after repair, removal, replacement, or adjustment of any thrust reverser component including pneumatic drive or control system components.

(2) Check cowl door ring and latch assembly dimensional requirements per 78-32-00 prior to any functional checks of the thrust reverser.

(3) After completion of any thrust reverser system maintenance, visually check surrounding areas for component security. Specifically check the flexible shaft connections at the upper and lower gearboxes and center drive unit and pneumatic tube connections.

(4) When performing maintenance inside a reverser half, use the core cowl maintenance step. Stepping on other areas of the core cowl could result in damage to fire protection coating.

(5) Translate thrust reverser as follows :

CAUTION : THRUST REVERSER TRANSLATION IS NORMALLY DONE WITH REVERSER HALVES CLOSED. IF INSPECTION REQUIRES TRANSLATION WITH REVERSER HALVES OPEN, THE FOLLOWING PRECAUTIONS MUST BE TAKEN OR EQUIPMENT DAMAGE COULD OCCUR :
DO NOT TRANSLATE THRUST REVERSER WITH EITHER HALF OPEN MORE THAN 34 DEGREES.
TRANSLATION MUST BE DONE MANUALLY.

(a) Release Center Drive Unit (CDU) brake by pulling handle out, away from CDU (approximately 60°) until a flat is felt.

(b) Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 601)

1 Push in the two buttons located on the LAA manual release lever.

2 Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(c) Remove two bolts securing lockout plate to CDU and remove plate.

(d) Remove screws securing transcowl clevis pin cover, and remove cover.

(e) Install a 0.25 in. (6.35 mm) square drive handle into auxiliary drive pad of CDU. Crank reverser toward deploy far enough to expose transcowl clevis pin.

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(f) Install the lockout plate square drive into the auxiliary drive pad

and secure with removed bolts.
TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-12, P. Block 401	Fan Reverser Flexible Shaft Assembly
- 78-32-00, P. Block 801	Fan Reverser Assembly
- 78-32-11, P. Block 401	Thrust Reverser Translating Cowl
- 78-36-01, P. Block 201	Thrust Reverser Door Opening Actuator

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open the fan cowl and thrust reverser doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.

**ON A/C 001-100,

B. Visual Inspection/Check

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Transcowl Clevis Pin Cover and Screws for :		
(a)Missing covers or screws	Not serviceable	Replace the missing covers or screws
(2)Actuator Mount Casting Forward Support Bracket for :		
(a)Cracks	None permitted	Replace mount casting
(b)Cracks in mounting feet	None permitted	Replace mount casting
(3)Aft Cone for :		
(a)Cracks adjacent to cut-outs for actuator	None permitted	Repair
(4)Transcowl Trailing Edges for :		
(a)Gouges	1.0 in. (25.4 mm) delaminations permitted, total	Replace translating cowl (Ref. 78-32-11,

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	3 in. (76.2 mm) per half separated by 3 in. (76.2 mm)	P. Block 401)
(5)Transcowl T-Hinges for :		
(a)Cracked lugs	Two adjacent lugs can be cracked if the lugs are not on the end of the assembly. A total of 4 cracked lugs are permitted for each hinge and blade assembly	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(6)Upper and Lower Guides and Brackets for :		
(a)Presence	Not serviceable	Replace guides
(b)Missing Teflon on guides	None permitted	Replace guides
(c)Loose or missing attaching fasteners on brackets	None permitted	Tighten bolts, replace rivets
(7)Actuator Rod End Bearing Clevises for :		
(a)Pulling away from attaching surfaces	Not serviceable	Replace transcowl (Ref. 78-32-11, P. Block 401)
(8)Forward Latch Ring (with fan reverser fully closed and latched) for :		
(a)Upper latch must open and clear U-bolt	Not serviceable	Readjust actuation cable length and/or U-bolt
(9)Deflection Limiters and Bumper Tubes for :		
(a)Delamination	None permitted	Replace limiter
(b)Deflection or bending	None permitted	Replace limiter
(10)Cowl Guide Brackets for :		
(a)Cracks in casting	None permitted	Replace brackets
(b)Cracks in	Not to exceed 0.050 in.	Replace bracket

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
sheet metal	(12.7 mm) separated by 1.0 in. (25.4 mm) of sound material and must not extend across rolled over leg through radius and into flat portion of sheet metal	

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INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(11)Interconnecting Drive Cables for :		
(a)Broken wires	None permitted	Replace casing and core (Ref. 78-31-12, P. Block 401)
(b)Separated wires	None permitted	Replace core (Ref. 78-31-12, P. Block 401)
(c)Deformation (kinks)	None permitted	Replace core (Ref. 78-31-12, P. Block 401)
(d)Local bowing	None permitted	Replace core (Ref. 78-31-12, P. Block 401)
(e)Wear	Maximum of 1/2 wire diameter	Replace casing and core (Ref. 78-31-12, P. Block 401)
(12)Flight compartment annunciator lights for :		
(a)All extinguished	No lights shall be illuminated with both halves fully stowed	Refer to Trouble-shooting Section if a light has come on
R (b)REV UNLK warning R light comes on in R deploy direction	Either half deployed 0.10-0.30 in. (2.5-7.6 mm) from fully stowed	Refer to Trouble-shooting Section if light does not come on

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(c)REV UNLK warning light goes off in deploy direction	Both halves deployed to within 0.71-0.46 in. (18.0-11.7 mm) of full deploy	Refer to Trouble-Shooting Section if light does not go off
(d)REV indicator light comes on in deploy direction	Both halves deployed to within 0.71-0.46 in. (18.0-11.7 mm) of full deploy	Refer to Trouble-Shooting Section if light does not come on
(e)REV indicator light goes off in stow direction	Either half 0.71-0.46 in. (18.0-11.7 mm) from full deploy	Refer to Trouble Shooting Section if light does not go off
(f)REV UNLK warning light comes on in stow direction	Either half 0.71-0.46 in. (18.0-11.7 mm) from full deploy	Refer to Trouble-Shooting Section if light does not come on
(g)REV UNLK warning light goes off in stow direction	Both halves 0.10-0.30 in. (2.5-7.6 mm) from full stow	Refer to Trouble-Shooting Section if light does not go off
(13)Hydraulic Power Door Actuator Mount Cap and Bracket for :		
(a)Cracks	None permitted	Replace (Ref. 78-36-01, P. Block 201).
(14)All Connections and Fittings for :		
(a)Leaks	None permitted	Repair or replace as required

C. Close-Up

(1)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(2)Return the brake handle to the locked position to engage the cone brake.

(3)Manually lock the locking actuator assembly (LAA) as follows : (Ref. Fig. 601)

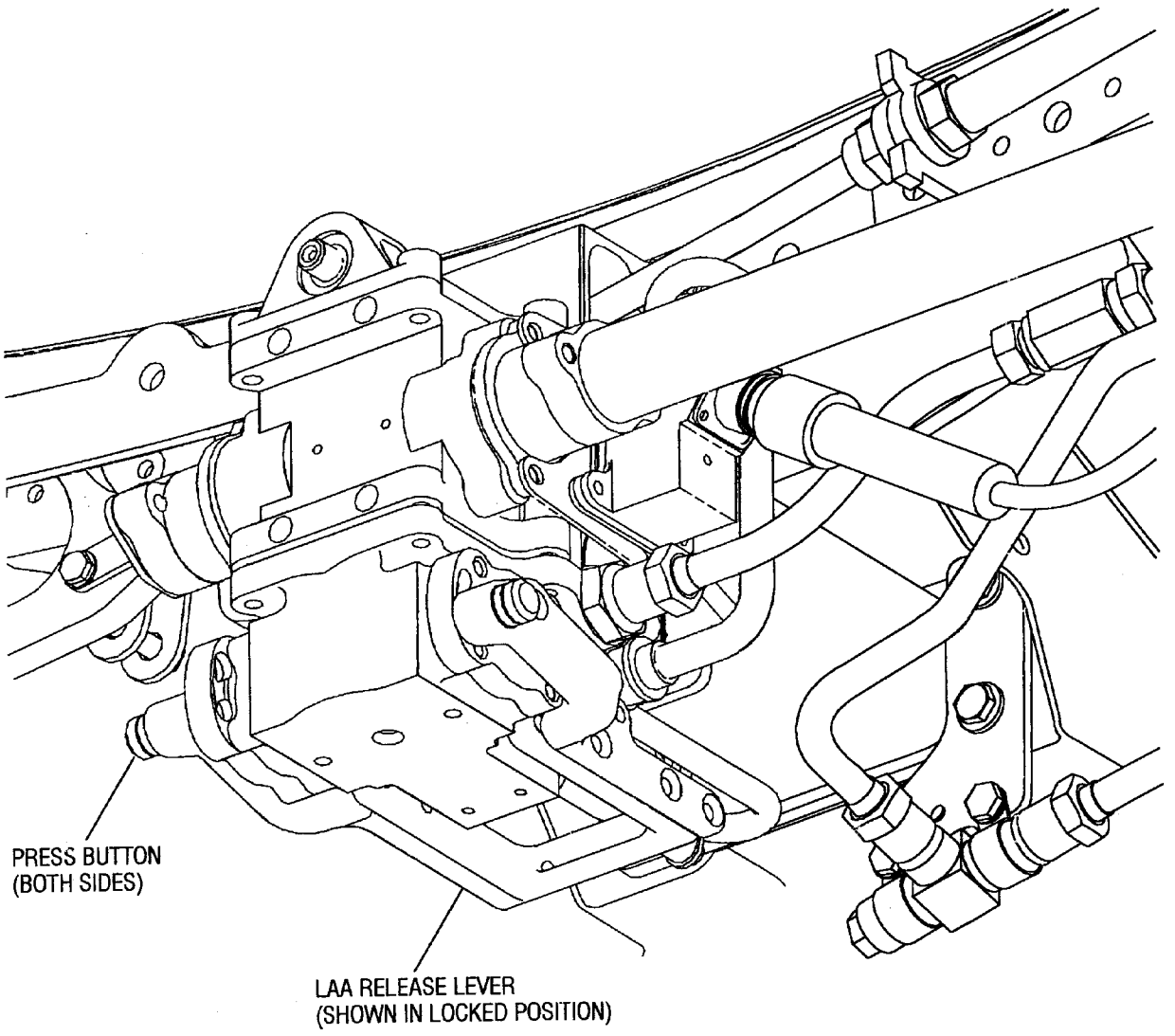
(a)Push in the two buttons located on the LAA manual release lever.

(b)Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(4)Remove access platform.

(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(6)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).



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Locking Actuator Assembly - Locking Release Lever
Figure 601

REVERSER SYSTEM CONTROL - DEACTIVATION/REACTIVATION

Ref. : MMEL Sect. 1-78, Item 1 (Thrust reversers)

1. Deactivation

A. Reason for the Job
If the reverser system has a malfunction and time does not permit troubleshooting, the system can be deactivated and locked. This will permit the aircraft to be dispatched until the malfunction can be corrected.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Torque Wrench 0-50 lbf.in. (0.0 - 0.56 m.daN)
Referenced Procedures	
- 36-00-00, P. Block 1	Pneumatic - General
- 49-00-00, P. Block 501	Airborne Auxiliary Power
- 71-13-00, P. Block 301	Cowl Doors

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C. Procedure
(1)Deactivation for flight dispatch.
WARNING : YOU MUST DO A DEACTIVATION OF EACH THRUST REVERSER HALF TO MAKE SURE THE THRUST REVERSER SYSTEM DOES NOT OPERATE. IF YOU DO A DEACTIVATION OF ONLY ONE THRUST REVERSER HALF, THE OTHER HALF CAN MOVE ACCIDENTALLY. INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT CAN OCCUR.
(a)Job set-up
1 Open, safety and tag the applicable circuit breakers and open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(b)Deactivate the center drive unit pneumatic system (Ref. Fig. 901).
1 Disconnect the 1.0 in. (25.4 mm) diameter flexible pneumatic tube from the 1.0 in. (25.4 mm) diameter rigid pneumatic tube.
2 Remove the blue anodized cap from the unused air supply port on the lower end of the center drive unit (CDU) and install the blue anodized cap on the 1.0 in. (25.4 mm) diameter rigid pneumatic tube. TORQUE the blue anodized cap to between 820 and 860 lbf.in. (9.27 and 9.72 m.daN).
3 Install locally obtained dust caps on the open end of the 1.0 in. (25.4 mm) diameter flexible pneumatic tube and on the open air supply port on the lower end of the CDU to prevent unwanted material

from entering the CDU.

4 Attach the 1.0 in. (25.4 mm) diameter flexible pneumatic tube to the aft side of the 1.0 in. (25.4 mm) diameter rigid pneumatic tube with locally obtained tie-wraps.

(c) Remove the three red lockout plates, labeled DO NOT OPERATE, from the lower torque box.

(d) Install the three red lockout plates, labeled DO NOT OPERATE, in the orientation shown in (Ref. Fig. 902), at the lock points on each translating cowl (Ref. Fig. 902).

NOTE : The lockout points are stenciled on each translating cowl.

NOTE : The locking bolts go through the outer flange of the fixed structure, go through the plates mounted on each translating cowl, and engage the nutplates on the back of the plates. If the locking bolts are missing from their storage location on
R the fixed structure face, you can use MS9489-12 bolts, or an
R equivalent alternative.

NOTE : If necessary, you can manually drive the CDU and upper/lower angle gearboxes from their unused manual drive pads to align the lockout plate nutplates with the lockout holes in the fixed structure.
Disengage the CDU cone brake and the locking actuator assembly before you perform this task.

(e) If the nutplates do not align with the fixed structure, do the steps that follow :

- Release the Center Drive Unit (CDU) brake by pulling handle out, away from the CDU (approximately 60°) until a flat is felt.
- Manually unlock the locking actuator assembly (LAA), if installed, as follows : (Ref. Fig. 905)
  . Push in the two buttons located on the LAA manual release lever.
  . Pull the release lever up and away from the LAA until the two buttons click into position and you can see green stripes on the buttons.
- Remove the two bolts that attach the lockout plate to the CDU and remove the plate (Ref. Fig. 903).
- Install a 0.25 in. (6.36 mm) square drive handle into the auxiliary drive pad of the CDU and manually align the nutplates with the fixed structure.
- If the upper and/or lower nutplates still does not align with the fixed structure :
  . Remove the two bolts that attach the cover plate to the upper and/or lower angle gearbox auxiliary drive pad and remove the cover plate.
  . Install a 0.20 in. (5.08 mm) square drive handle into the auxiliary drive pad of upper and/or lower angle gearbox and manually align the nutplates with the fixed structure.
  . Remove the square drive handle from the upper and/or lower angle gearbox.
- Remove the square drive handle from the CDU auxiliary drive pad and apply the CDU brake.
- Manually lock the locking actuator assembly (LAA) as follows :
  . Push in the two buttons located on the LAA manual release lever.

. Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(f)Install two bolts through each red lockout plate, through the translating cowl and fixed structure, and into the nutplates. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(g)Remove the bolts that attach the stored inverted CDU lockout cover on the left and right CDU auxiliary drive pads. Install the square drive of the CDU lockout cover into the auxiliary drive and attach it with the bolts you removed. Make sure you can see the red-colored face of the lockout cover. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN) (Ref. Fig. 903).

(h)Find the directional pilot valve (DPV) and pressure switch mounted on the torque box at the 10 o'clock position. Disconnect the electrical connectors from the DPV solenoid and pressure switch (Ref. Fig. 904). Install locally obtained protective caps on the two electrical connectors and the DPV solenoid and pressure switch. Use tie-wraps to attach the electrical connectors to the two unused holes on the upper actuator casting. Do not attach the electrical connectors to the electrical cable that leads to the stow/deploy switch.

(i)Close-up

1 Remove the safety clips and tags and close the applicable circuit breakers.

2 Make sure the work area is clean and clear of tools and miscellaneous items of equipment.

3 Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

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D. Test

(1)With the engine not running, make sure that the throttle control lever of the applicable engine can be moved to the forward stop.

CAUTION : YOU MUST USE AN EXTERNAL PNEUMATIC POWER SOURCE THAT CAN GIVE A MINIMUM 20 PSI (138 KPA) AND AN AIR FLOW OF 210 STANDARD CUBIC FEET PER MINUTE (5.9 M^3/MN) TO CORRECTLY OPERATE THE REVERSER FOR THIS TEST.

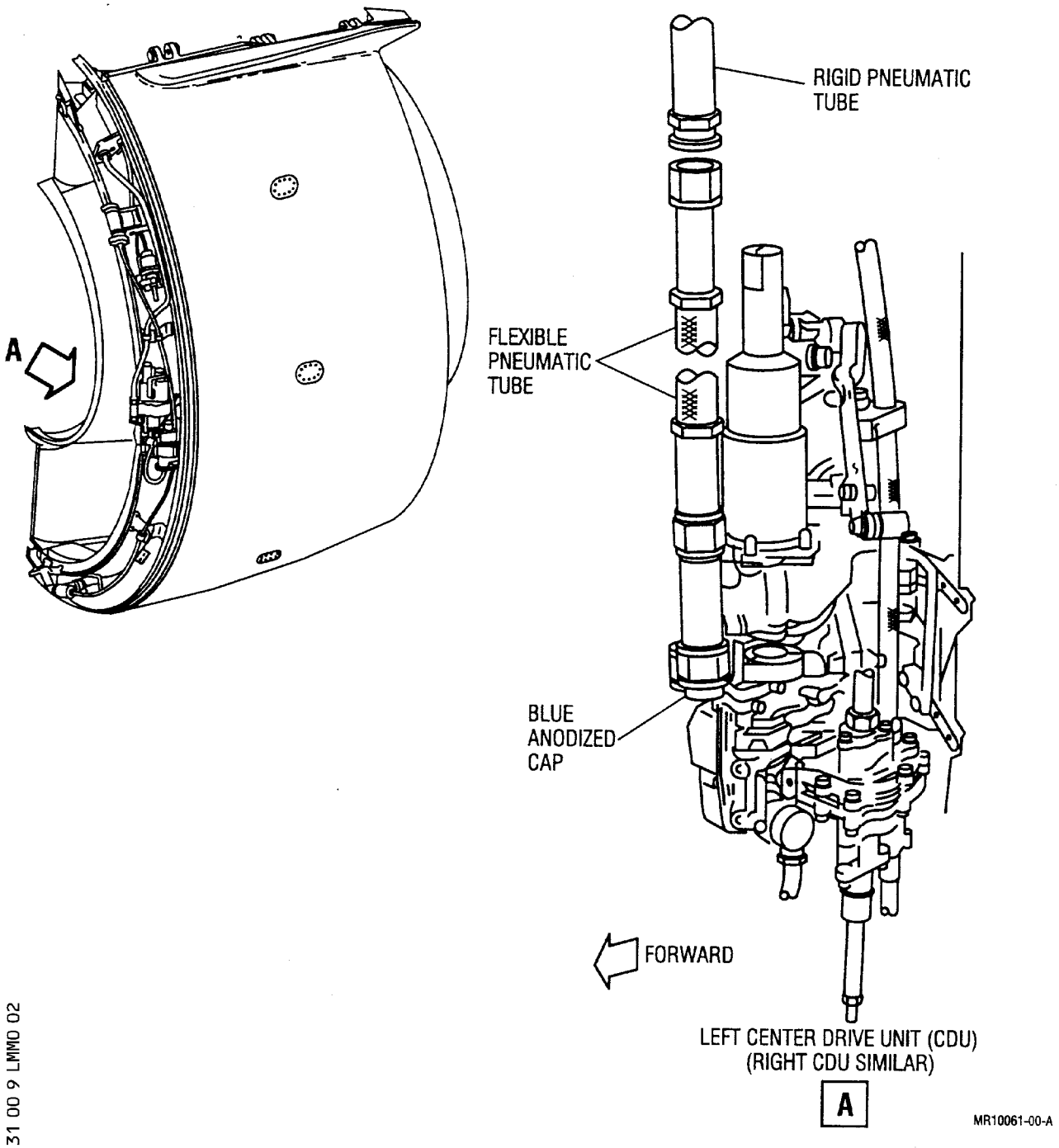
(2)Connect an external pneumatic power source to the aircraft ground air connection (Ref. 36-00-00, P. Block 1) or the APU (Ref. 49-00-00, P. Block 501).

(3)Move the thrust reverser control lever to the deploy position. Make sure that the reverser will not operate and the throttle interlock prevents the application of full reverse thrust.

(4)Disconnect the external pneumatic power source from the aircraft ground air connection (Ref. 36-00-00, P. Block 1) or the APU (Ref. 49-00-00, P. Block 501).

E. In the Flight Compartment

(1)Install a temporary warning notice to tell the flight crew to disregard the REV UNLK warning light if it comes on after the thrust reverser is deactivated.



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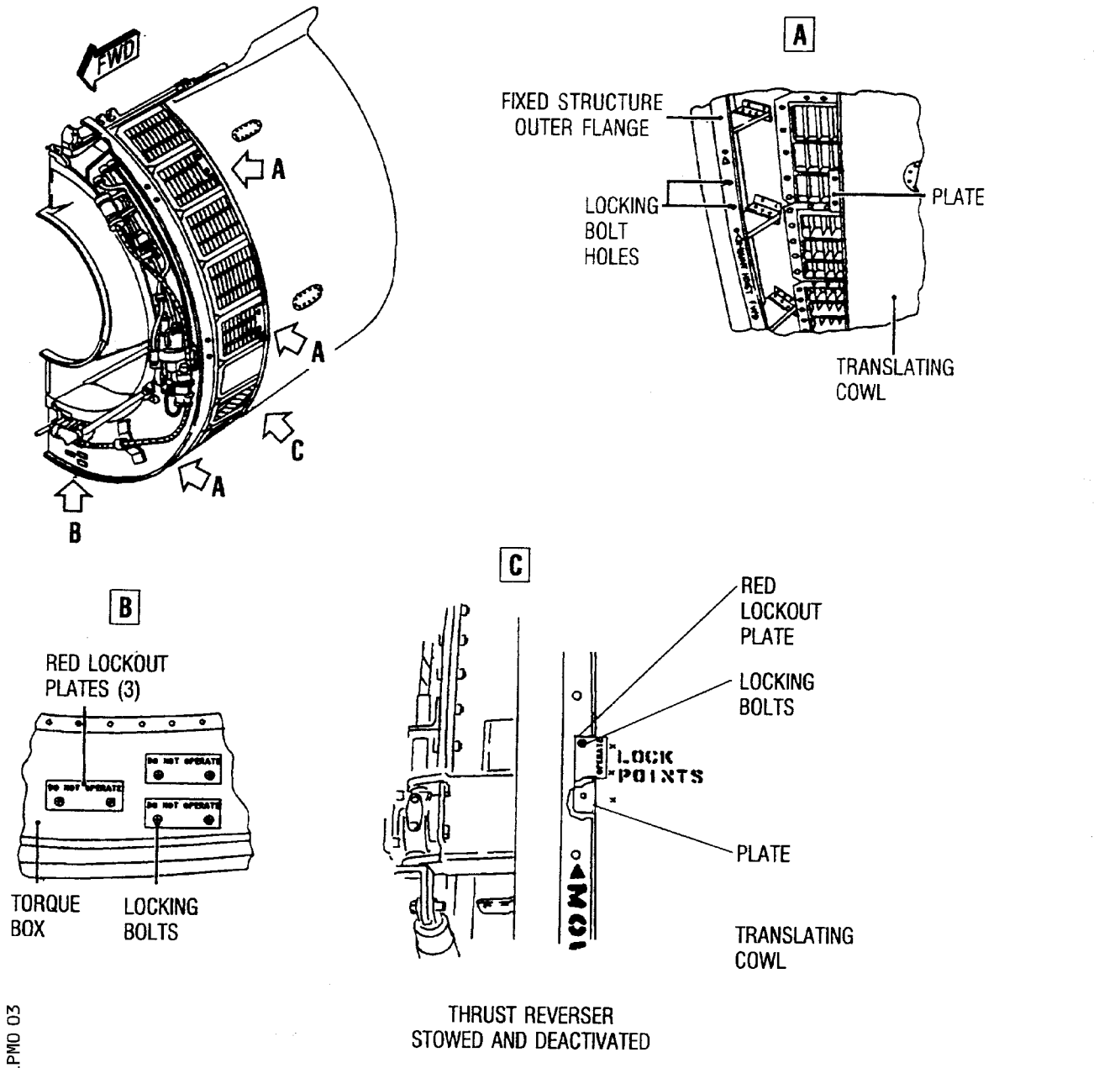
Center Drive Unit Pneumatic Deactivation
Figure 901



THRUST REVERSER
STOWED AND DEACTIVATED

MR10050-02-A

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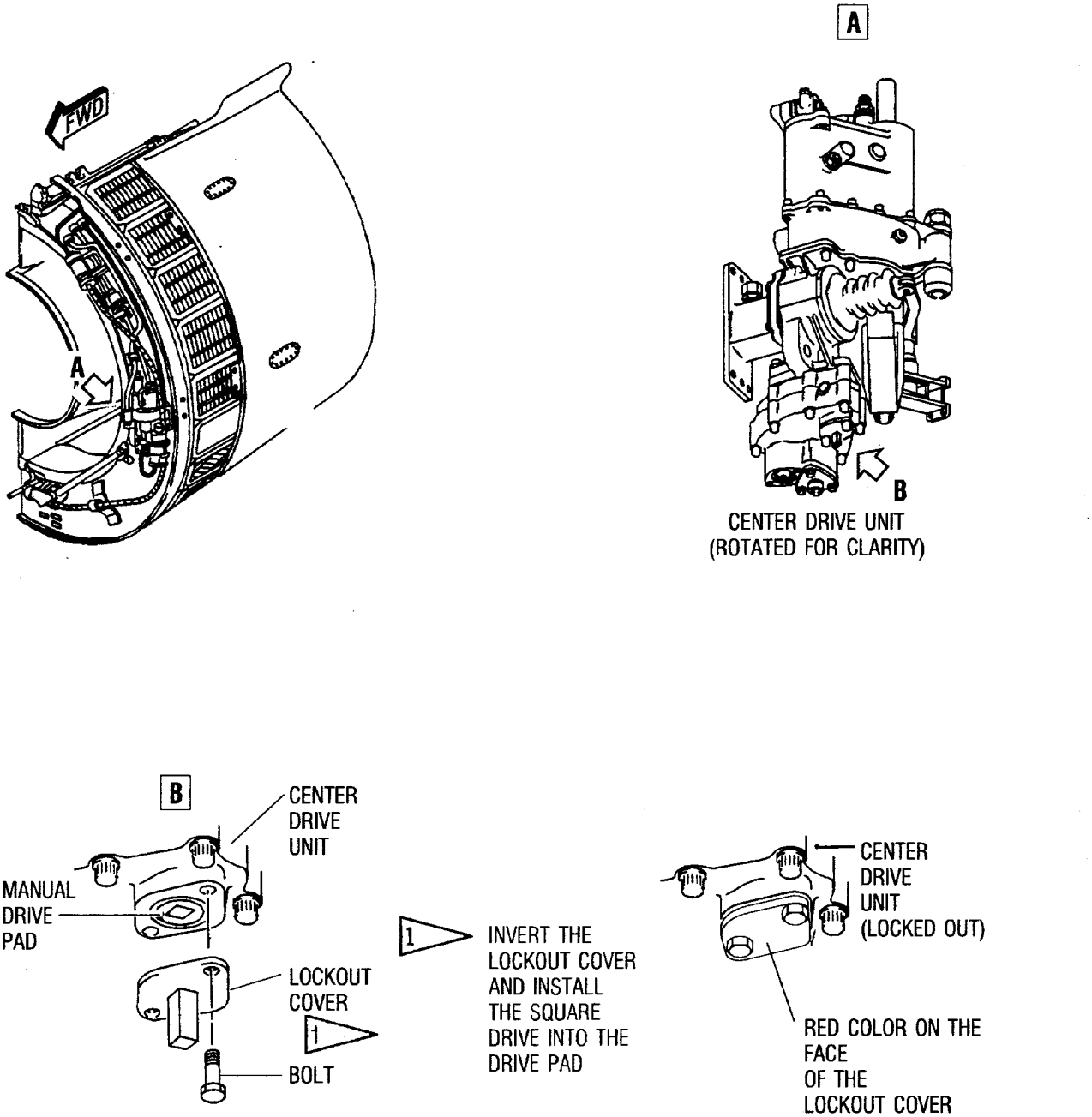
Installation of the Red-Colored Lockout Plates on the Translating Cowl
Figure 902



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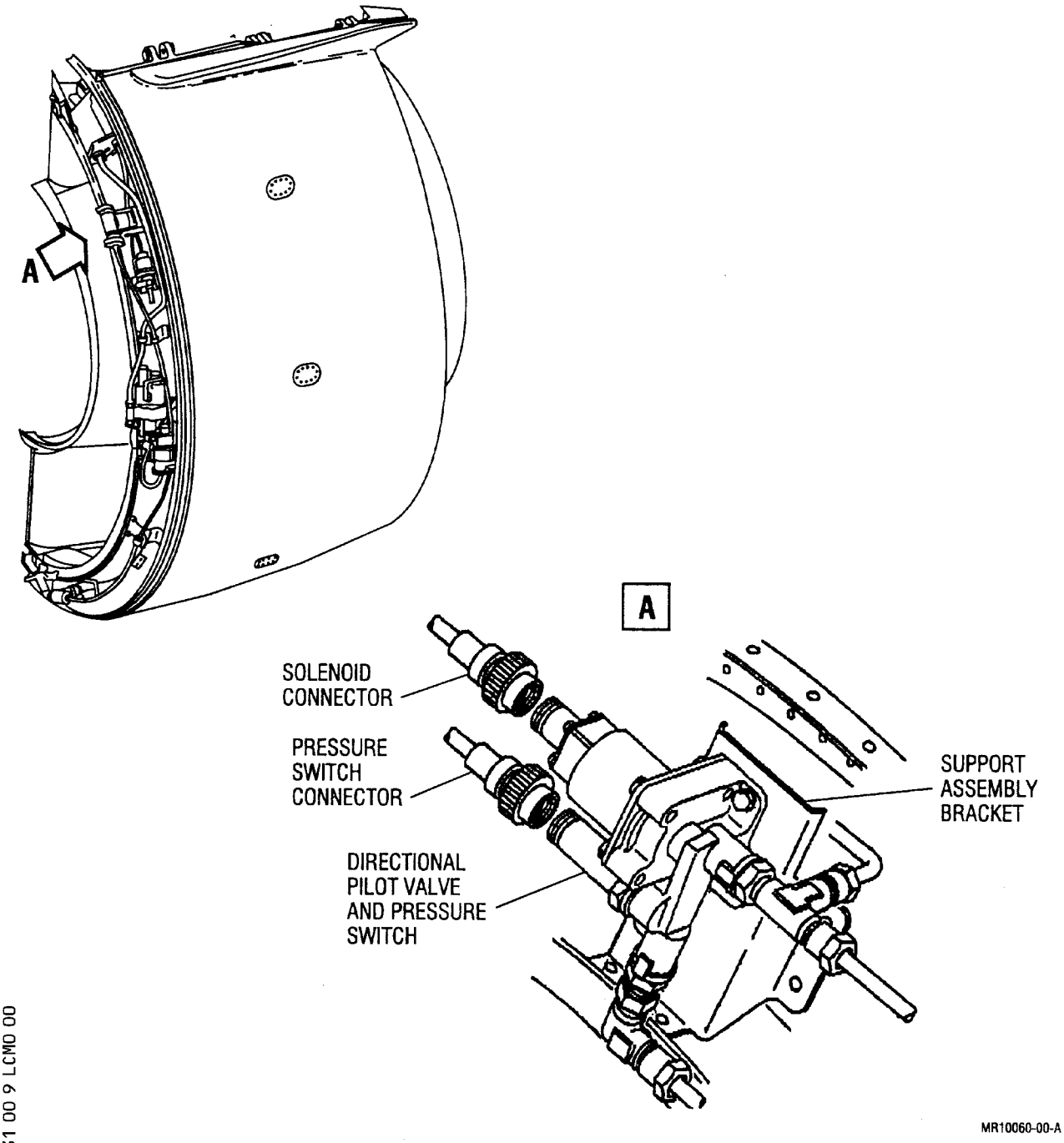
Installation of the Lockout Cover on the CDU
Figure 903



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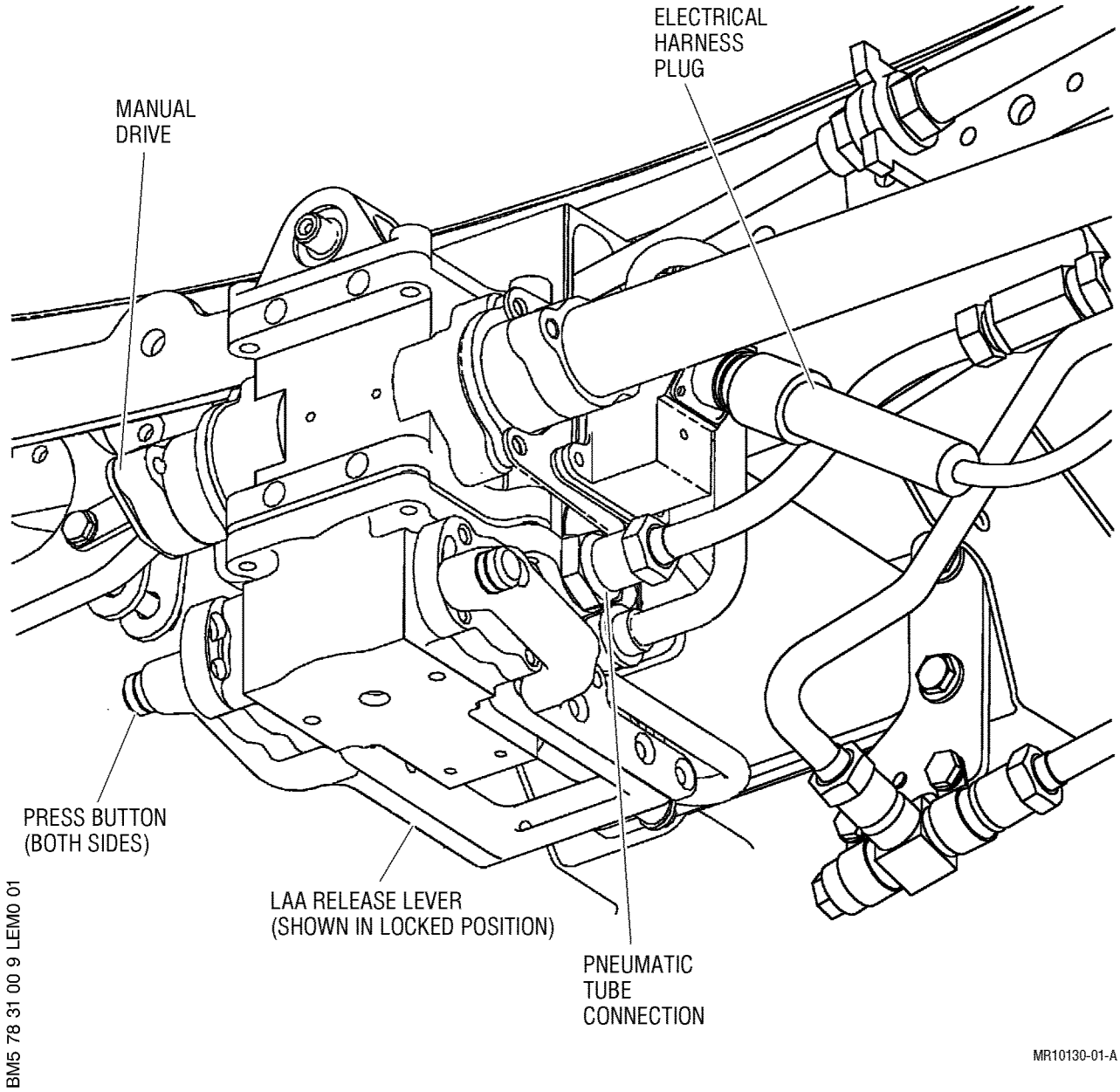
Directional Pilot Valve Deactivation
Figure 904



Locking Actuator Assembly (LAA) Lock Release Lever
Figure 905

R

2. Deactivation for Maintenance

WARNING : YOU MUST DO A DEACTIVATION OF EACH THRUST REVERSER HALF TO MAKE SURE THE THRUST REVERSER SYSTEM DOES NOT OPERATE. IF YOU DO A DEACTIVATION OF ONLY ONE THRUST REVERSER HALF, THE OTHER HALF CAN MOVE ACCIDENTALLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING : FAILURE TO DEACTIVATE THE THRUST REVERSER HALF FOR GROUND MAINTENANCE CAN RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

A. Reason for the Job
Self explanatory.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notice
(3)	Adjustable Access Platform 1.22 m (4 ft.)
(4)	Access Platform 2.5 m (8 ft. 2 in.)
(5)	Torque Wrench, 0-50 lbf.in. (0.0-0.56 m.daN)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(1)Job set-up
(a)Energize the ground service network (Ref. 24-41-00, P. Block 301).
(b)Make sure that the engine 1, (2) shutdown occurred not less than 5 minutes before you do this procedure.
(c)Get access to the avionics compartment.
(d)Open, safety, and tag the applicable circuit breakers.
(e)Open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(f)Install an adjustable access platform.
(2)Deactivate the thrust reverser.
(a)Make sure the CDU brake handle is in the stowed position.
(b)Remove the two bolts that attach the stored, inverted CDU lockout plate to the CDU. Remove the lockout plate.
(c)Install the CDU lockout plate square spline into the auxiliary drive pad, and attach it with the bolts you removed. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(d)Install a warning notice on the CDU to tell persons that the thrust reverser is deactivated.
(e)Do steps (a) through (d) again for the opposite thrust reverser half.

3. Reactivation

A. Reason for the Job

R Cancel deactivation in order to troubleshoot and repair the malfunction.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Torque Wrench 0-50 lbf.in. (0.0 - 0.56 m.daN)
R (3)Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

C. Procedure

CAUTION : YOU MUST DO AN ACTIVATION OF EACH THRUST REVERSER HALF TO MAKE SURE THE THRUST REVERSER SYSTEM OPERATES CORRECTLY.

(1)Job set-up

Open, safety, and tag the applicable circuit breakers and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

(2)Do the steps that follow to activate the thrust reverser system.

(a)Remove the red lockout plates, labeled DO NOT OPERATE, from the left and right translating cowl lockout points. Install the lockout plates and the locking bolts in their storage locations on the torque box (at approximately the 5 o'clock and 7 o'clock positions). TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN) (Ref. Fig. 902).

(b)Remove the bolts that attach the left and right CDU lockout covers (with the red-colored face out) to the left and right auxiliary drives.

(c)Remove the CDU lockout covers from the auxiliary drives.

(d)Use the same bolts to attach the CDU lockout covers to the left and right CDU auxiliary drives. Make sure the square drive is out. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN) (Ref. Fig. 903).

(e)Remove the caps from the DPV solenoid and pressure switch connectors and connect the connectors to the DPV solenoid and pressure switch.

(f)Activate the center drive unit pneumatic system (Ref. Fig. 901).

1 Remove the temporary dust caps from the air supply port on the lower side of the CDU and from the open end of the 1.0 in. (25.4 mm) diameter flexible pneumatic tube.

2 Remove the blue anodized cap from the 1.0 in. (25.4 mm) diameter rigid pneumatic tube just above the CDU. Install the blue anodized cap on the open air supply port on the lower side of the CDU. TORQUE the blue anodized cap to between 820 and 860 lbf.in. (9.27 and 9.72
R m.daN). Safety the cap with stainless steel lockwire (Material
R No. C10-071).

3 Connect the 1.0 in. (25.4 mm) diameter flexible pneumatic tube to the 1.0 in. (25.4 mm) diameter rigid pneumatic tube.
R TORQUE to between 112 and 128 lbf.ft. (15.2 and 17.4 m.daN).
R Safety the fitting nut with stainless steel lockwire (Material
R No. C10-071).

(3)Close-up
(a)Remove the temporary warning notice from the flight compartment.
(b)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(c)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).
(d)Remove the safety clips and tags and close the circuit breakers.

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4. Reactivation after Maintenance

WARNING : YOU MUST DO AN ACTIVATION OF EACH THRUST REVERSER HALF TO MAKE SURE THE THRUST REVERSER SYSTEM OPERATES CORRECTLY. IF YOU DO AN ACTIVATION OF ONLY ONE THRUST REVERSER HALF, IT CAN MOVE ACCIDENTALLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

A. Reason for the Job
Self explanatory.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Adjustable Access Platform 1.22 m (4 ft.)
(2)	Access Platform 2.5 m (8 ft. 2 in.)
(3)	Torque Wrench, 0-50 lbf.in. (0.0-0.56 m.daN)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System

C. Procedure
(1)Job set-up
(a)Make sure the ground service network is energized (Ref. 24-41-00, P. Block 301).
(b)Make sure that the applicable access platforms are in position.
(c)Make sure that the applicable access door is open.
(d)Make sure the left fan cowl door is open (Ref. 71-13-00, P. Block 301).
(e)Make sure the applicable circuit breakers are open, safetied, and tagged.
(2)Reactivate the thrust reverser.
(a)Remove the two bolts that attach the lockout plate to the CDU and remove the plate.
(b)Make sure the locking actuator assembly (LAA) is locked. If it is not locked, do the steps that follow : (Ref. Fig. 905).
- Push in the two buttons located on the LAA manual release lever.
- Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(c)Install the lockout plate with the square spline out on the CDU auxiliary drive pad. Attach it with the bolts you removed. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(d)Make sure the CDU brake handle is in the stowed position.
(e)Remove the warning notice from the CDU.
(f)Do steps (a) through (e) again for the opposite thrust reverser half.
(g)Remove the safety clips and tags, and close the applicable circuit breakers.

(3)Do a system test of the thrust reverser (Ref. 78-31-00, P. Block 501).

(4)Job Close-up
(a)Close the applicable access door.
(b)Make sure the work area is clean and clear of tools and other miscellaneous items of equipment.
(c)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).
(d)Remove the access platform(s).
(e)De-energize the ground service network (Ref. 24-41-00, P. Block 301).

**ON A/C 001-100,

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"REV" Light

Ref. : MMEL Sect. 1-78, Item 3 ("REV" lt.)

1. Deactivation

A. Reason for the Job
Failure of REV indicator light circuit.
REV indicator light operational test.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breakers Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowls Doors
- 24-41-00, P. Block 301	AC External Power Control
- 23-44-00, P. Block 501	Cabin and Service Interphone
- 78-31-00, P. Block 501	Reverser System Control

C. Procedure
(1)Job set-up
WARNING : MAKE SURE THAT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE YOU START MAINTENANCE PROCEDURE INADVERTENT ENGINE START OR THRUST REVERSER OPERATION CAN CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL.
(a)Open, safety and tag the applicable circuit breakers and open fan cowl door (Ref. 71-13-00, P. Block 301).
(b)Manually stow the translating sleeves if malfunction has occured in partially or fully deployed position (Ref. 78-31-00, P. Block 501).
(c)Connect electrical ground power and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Connect interphone system between flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).
(e)Activate reverser manually as follows :
CAUTION : FAN REVERSER TRANSLATION IS NORMALLY DONE WITH REVERSER HALVES CLOSED. IF INSPECTION MAKES IT NECESSARY THAT TRANSLATION BE DONE WITH REVERSER HALVES OPEN, THE FOLLOWING PRECAUTION MUST BE TAKEN OR DAMAGE EQUIPMENT CAN OCCUR : DO NOT TRANSLATE FAN REVERSER WITH EITHER HALF OPEN MORE THAN 34 DEGREES.
- Release Center Drive Unit (CDU) brake by pulling handle out, away from CDU (approximately 60°) until a flat is felt.
- Manually unlock the locking actuator assembly (LAA) as follows :

(Ref. Fig. 905).
- Push in the two buttons located on the LAA manual release lever.
- Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

- Remove the two bolts that attach the lockout plate to the CDU and remove the plate.
- Install a 0.25 in. (6.35 mm) square drive handle into the auxiliary drive pad of CDU.
- Remove safety clips and tags and close applicable circuit breakers 1KM (2KM).

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(2)Test
(b)Perform the following test :

ACTION	RESULT
1. Move the thrust reverser control lever to the Idle position, and manually deploy the reversers from stow position to the middle of the deploy travel	Check that : - REV UNLK warning light comes on - The thrust reverser control lever cannot move in the reverse full thrust.
2. Deploy reversers to full deploy stop.	Check that : - REV UNLK warning light goes off.
3. Move reversers from deploy position to the middle of the stow travel.	Check that : - REV UNLK warning light comes on.
4. Stow reversers to full stow stop.	Check that : - REV UNLK warning light goes off.

(3)Close-up
(a)Remove square drive handle from center drive unit socket and apply brake.
(b)Manually lock the locking actuator assembly (LAA) as follows :
- Push in the two buttons located on the LAA manual release lever.
- Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(c)Install the CDU lockout plate to the auxiliary drive pads with the square drive spline exposed.
(d)With the same bolts, attach the CDU lockout plate to the left and right CDU auxiliary drive pads. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(e)Make sure that working area is clean and clear of tools and miscel-

laneous items of equipment.

(f) De-energize the aircraft electrical network.

(g) Close fan cowl door (Ref. 71-13-00, P. Block 301).

(h) Remove safety clips and tags and close appropriate circuit breakers.

(i) Disconnect interphone system between flight compartment and the applicable engine area.

(j) Install a temporary placard in the flight compartment to warn the crew members that REV indicator light 11KM (12KM) is inoperative.

2. Reactivation

Refer to TSM 78-31-00.

CENTER DRIVE UNIT/FEEDBACK GEARBOX ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. The Fan Reverser incorporates 2 center drive units, one for each reverser half. Drive units are mounted at the 3 o'clock and 9 o'clock positions of each reverser.
B. The Center Drive Unit (CDU) is removed and installed as an assembly. After the CDU is removed, you can remove the Feedback Drive Unit (FDU) from the CDU for shipment to a maintenance facility, but no further disassembly of the CDU is permitted at the line maintenance level.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. 2C6367	Tool Install/Remove - Pin, Fan Reverser Actuator
C.	Corrosion Resistant Steel Lockwire
D.	Torque Wrench 14-860 lbf.in. (0.158 - 9.7 m.daN)
E. Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
F. Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
G. Material No.C02-027	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
H. Material No.C02-057	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
R I. Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Make certain that the ground air supply hose is removed and coupling cap is installed onto starter air supply duct.

B. Removal (Ref. Fig. 401)
(1)Release center drive unit brake by pulling handle out away from CDU (approximately 60°) until flat is felt.
(2)Remove two bolts securing lockout plate to CDU and remove plate.
(3)Remove screws and transcowl clevis pin cover.

(4)Install a 0.25 in. (6.35 mm) square drive handle into lockout spline. Crank reverser towards deploy enough to expose the ballscrew actuator clevis pin.
(5)Remove lockwire and disconnect pneumatic supply flex hose.
(6)Open quick release clamps on flexshafts.
R (7)Remove bolts attaching flexshafts to the center drive unit.
NOTE : Exercise caution to prevent upper flexshaft core from sliding out of sheath.
(8)Remove flexshafts from CDU and stow to prevent cores from sliding out.
(9)Disconnect electrical connector.
(10)Disconnect signal air line at the center drive unit (located on the lower side of right CDU and upper side of left CDU).
(11)Remove cotter pin, nut, and washer and disconnect the throttle feedback cable.
CAUTION : DO NOT REMOVE CLEVIS PIN RETAINING CLIP BOLT. BACK BOLT OUT ENOUGH TO ROTATE RETAINING CLIP. REMOVAL OF BOLT WILL DAMAGE NUTPLATE.
(12)Loosen bolt securing retaining clip and turn clip 90°.
(13)Remove internally threaded clevis pin by inserting slide hammer tool 2C6367 and tapping pin out.
(14)If the translating cowl clevis pin cannot be removed from the outer side of the translating cowl, use the following procedure to remove the clevis pin from the inner side of the translating cowl (Ref. Fig. 402). Otherwise, go to paragraph (15).
(a)Get access to the inner side of the translating cowl.
(b)Remove the sealant and get access to the rod end bearing pin access cap at the ballscrew actuator.
(c)Remove the rod end bearing pin access cap.
(d)Remove the inner retainer.
(e)Use the pin install/remove tool 2C6367G01 to remove the clevis pin that attaches the ballscrew actuator to the translating cowl.
(15)Record the number of shims above and below the CDU flange.
(16)Remove CDU flange bolts and washers, record location of shims for reinstallation.
(17)Carefully remove center drive unit.
(18)Measure length of CDU ballscrew actuator and record for installation of new CDU.

C. Installation
(1)Release CDU brake by pulling handle out, away from CDU, approximately 60° (until a flat can be felt). Hand crank reverser towards the deploy position the same length as was recorded in step B. (18).
(2)Install CDU in support structure and into clevis.
(3)Install transcowl clevis pin.
NOTE : If the clevis pin was removed from the inner side of the translating cowl, do steps 3.C.(6) through 3.C.(6)(h).
(4)Position retaining clip over clevis pin and TORQUE bolt to between 55 and
R 70 lbf. in. (0.62 - 0.79 m.daN). Install lockwire (Material No. C10-071)
R through the head of the bolt and around the retaining clip.
CAUTION : DO NOT TORQUE THE COVER PLATE SCREWS MORE THAN THE SPECIFIED TORQUE VALUE. TOO MUCH TORQUE ON THE SCREWS CAN CAUSE CRACKS

IN THE COVER PLATE.

(5)Install the cover plate and TORQUE screws to between 22 and 27 lbf. in (0.24 and 0.30 m.daN).

(6)If the clevis pin was removed from the inner surface of the translating cowl, install the clevis pin as follows (Ref. Fig. 402). Otherwise, go to paragraph (7).

(a)Align the ballscrew rod end bolt hole with the translating cowl clevis bolt hole.

(b)Get access to the inner surface of the translating cowl. Install the clevis pin through the ballscrew rod end bolt hole and the clevis bolt hole.

WARNING : MATERIAL NO.C02-057 IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-057 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-057 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(c)Lubricate the threads of the inner retainer with Material No.C02-057.

(d)Install the inner retainer.

WARNING : MATERIAL NO.C02-027 IS AN AGENT THAT IS POISONOUS, CARCINOGENIC, AN ASPHYXIANT, AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-027 IS USED.
- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAME.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-027 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(e)Lubricate the threads of the rod end bearing pin access cap with Material No.C02-027.

(f)Install the rod end bearing pin access cap.

(g)TORQUE the rod end bearing pin access cap to between 76 and 100 lbf.in. (0.86 and 1.13 m.daN).

WARNING : MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS USED.

- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(h) Apply Material No.C01-073 or Material No.C01-115 fully on the rod end bearing pin access cap.

(7) Install shims removed in step B. (16). Be sure to reinstall shims in same location as when removed.

(8) Insert flange mounting bolts and washers. TORQUE to between 55 and
R 70 lbf. in. (0.62 - 0.79 m. daN).

(9) Connect signal air line to center drive unit. TORQUE B-nut to between 135 and 150 lbf. in. (1.53 - 1.69 m.daN) and wirelock.

(10) Connect wire harness plug to electrical connector on CDU and hand tighten.

(11) Insert aircraft throttle feedback cable, tighten nut at upper part of CDU and wirelock. Install washer, nut, and cotter pin.

(12) Rig reverser actuation system (Ref. 78-31-00, P. Block 501).

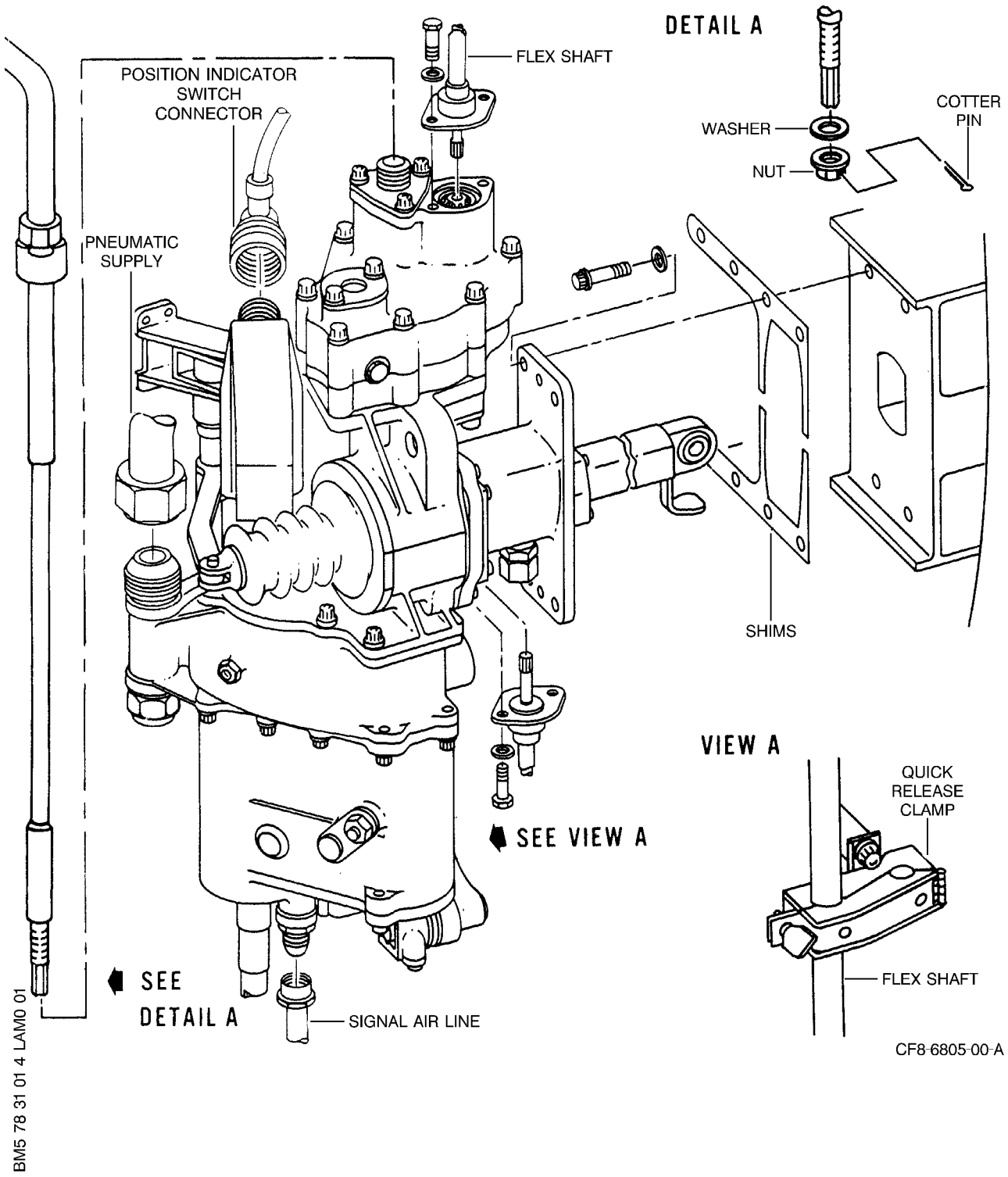
(13) Connect quick release clamps to flexshaft.

(14) Connect pneumatic supply flex hose. TORQUE B-nut to between 112 and 128 lbf.ft. (15.2 and 17.4 m.daN) and wirelock.

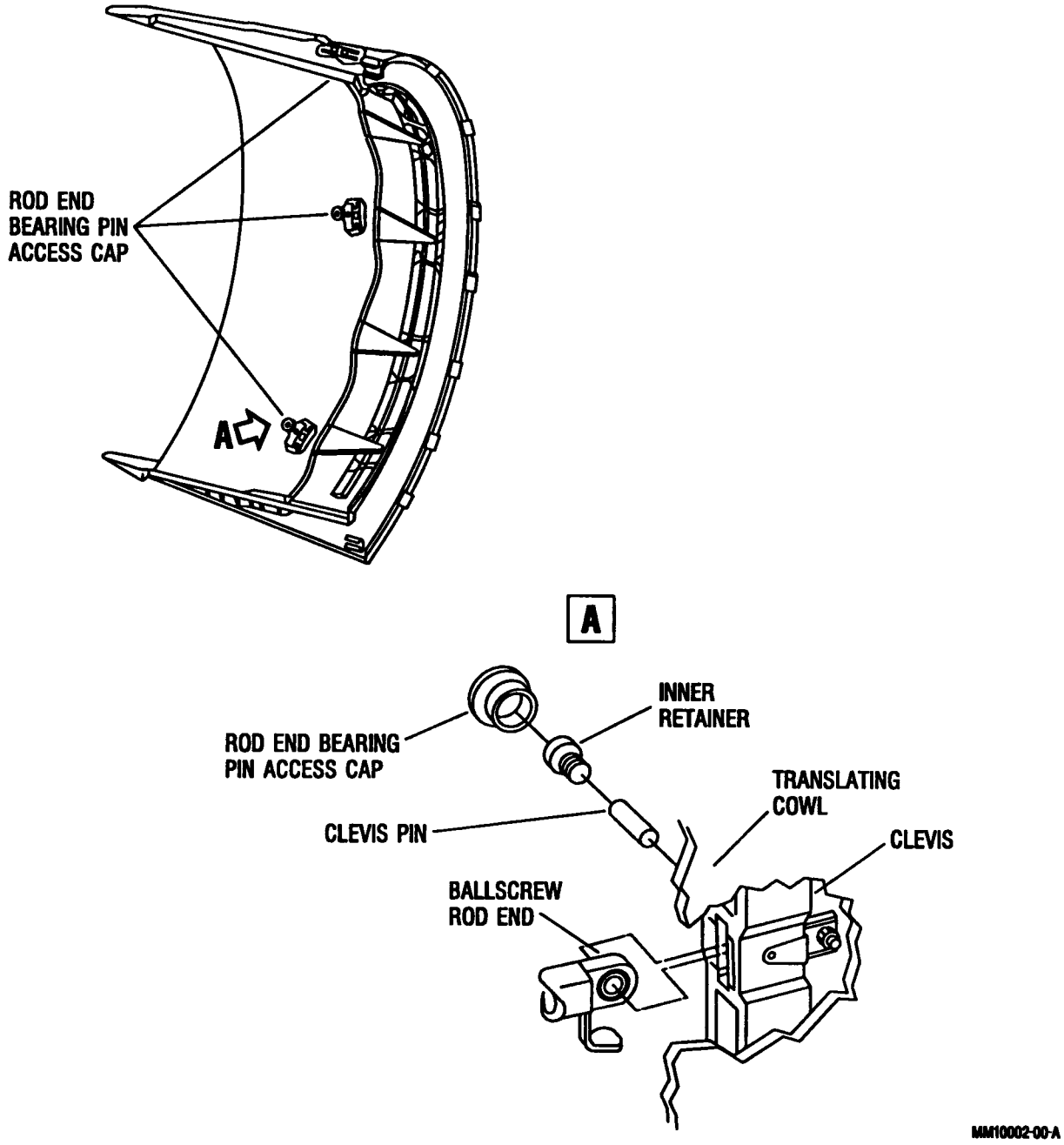
D. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.



Center Drive Unit - Removal/Installation
Figure 401



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Clevis Pin - Alternative Removal Method
Figure 402

CENTER DRIVE UNIT - ADJUSTMENT/TEST

1. Reason for the Job
To check that the CDU cone brake holding torque is within the acceptable value.

2. Equipment and Materials

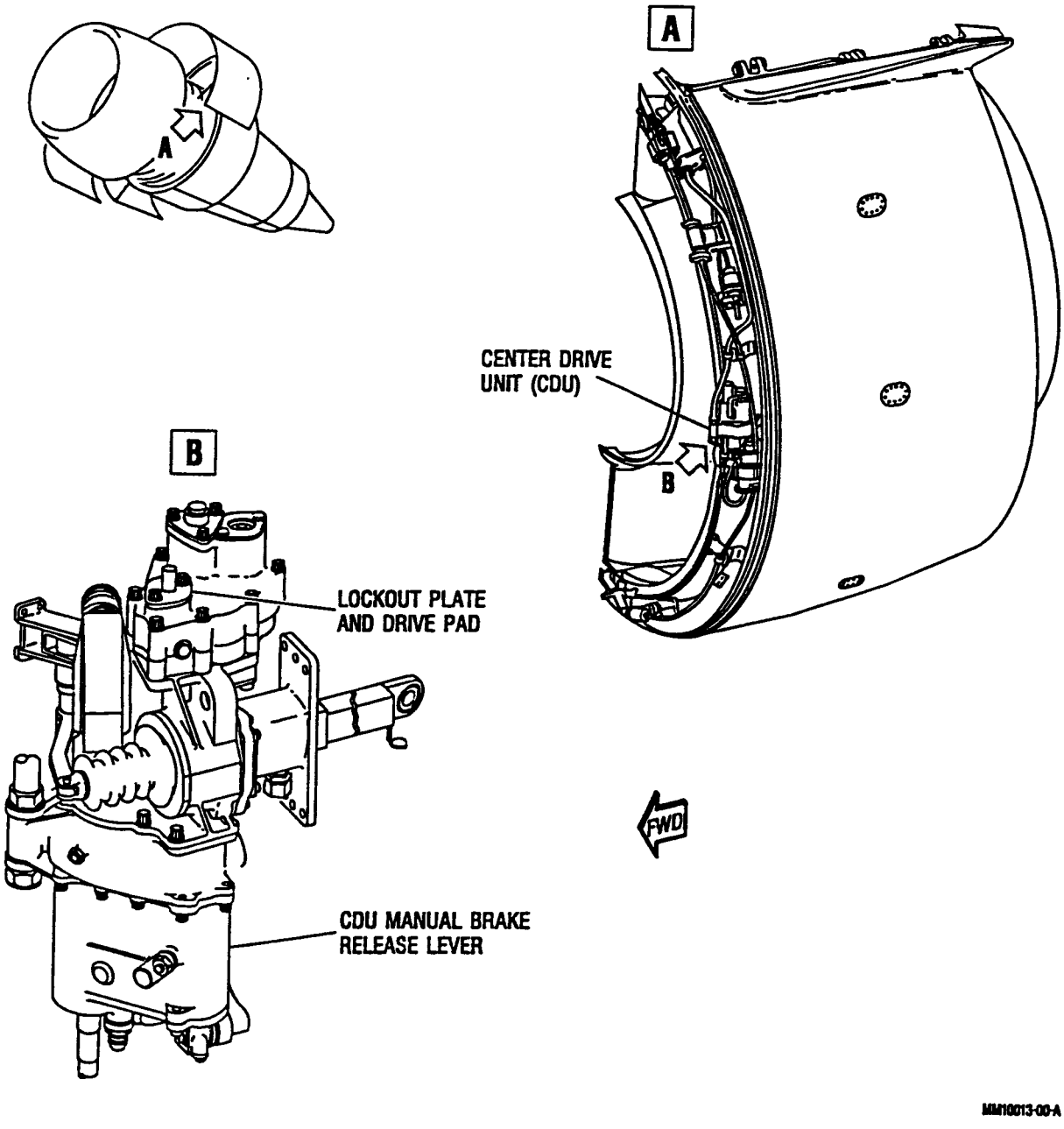
ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Dial-Type Torque Wrench
C.	Torque Wrench 14-860 lbf.in. (0.16 - 9.7 m.daN)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure (Ref. Fig. 501)

A. Job-Set-Up
(1)Open, safety, and tag the appropriate circuit breakers.
(2)Open the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Do a check of the holding torque of the center drive unit (CDU) cone brake.
(1)Release the CDU brake by pulling the handle out away from the CDU (approximately 60°) until a flat is felt.
NOTE : This will release the pre-load tension that may occur during a stow cycle.
(2)Remove the two bolts that secure the lockout plate to the CDU, and remove the plate.
(3)Install a 0.25 in. (6.35 mm) square drive handle into the lockout spline. Crank the reverser in the deploy direction approximately 1.0 in. (25.4 mm).
(4)Return the brake handle to the locked position to engage the cone brake.
(5)Install a 0.25 in. (6.35 mm) square drive handle and a dial-type torque wrench into the lockout spline.
CAUTION : DO NOT USE MORE THAN 100 LBF.IN. (1.13 M.DAN) OF TORQUE WHEN YOU DO THE CHECK. EXCESSIVE TORQUE WILL DAMAGE THE CDU.
(6)Turn the torque wrench to try to manually deploy the translating cowl until you get at least 15 lbf.in. (0.17 m.daN) of torque. If the manual drive turns in the deploy direction with less than 15 lbf.in. (0.17 m.daN) of torque, replace the CDU.
(7)Retract the translating cowl to the fully stowed position.
(8)Install the lockout plate on the CDU drive pad with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

C. Close-Up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(3)Remove the safety clips and tags. Close the circuit breakers.



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Functional Check of the CDU Brake
Figure 501

CENTER DRIVE UNIT - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-01, P. Block 401	Center Drive Unit

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Inspection/Check
(1)Inspect the following :

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(a)Rod-End Bearing for :		
1 Wear	0.010 in. (0.25 mm) end play maximum	Replace if limit is exceeded or is not free to rotate
2 Nicks, scratches, or scoring	Any amount of minor damage provided uniball rotates freely	Minor damage may be polished with abrasive cloth
3 Cross threading	None allowed	Replace rod-end bearing
(b)Ballscrew for :		
1 Grooves or evidence of brinelling or pitting	None allowed	Replace CDU (Ref. 78-31-01, P. Block 401)
(c)Actuator Tube Surface for :		
1 Nicks, dents or scratches	Any amount of minor damage	0.030 in. (0.75 mm) maximum depth. Must not cause erratic actuator operation
2 Cracks	None allowed	Replace (Ref. 78-31-01, P. Block 401).
(d)Flex Shaft Mating Surface for :		

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
1 Mating flange for nicks, dents and scratches	Any amount that can be blend repaired	Replace (Ref. 78-31-01, P. Block 401).
(e)Pneumatic Tube Connection for :		
1 Nicks, dents, and scratches	Any number not exceeding 0.030 in. (0.75 mm) depth or diameter after removal of high metal	Replace CDU
2 Thread damage	Total of one thread missing after chasing	Replace CDU
(f)Feedback Rod and Connection for :		
1 Nicks, scratches, and distortion	Any number not exceeding 0.030 in. (0.75 mm) depth or diameter after removal of high metal	Replace CDU
2 Thread damage	Total of one thread missing after chasing	Replace CDU
3 Secure connection of cable to rod	Connection must be tight	Retighten locknut

C. Close-Up
(1)Remove safety clips and tags and close circuit breakers, close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

CENTER DRIVE UNIT - APPROVED REPAIRS

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench 24-27 lbf.in. (0.27 - 0.31 m.daN)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

2. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(2) Remove bolts securing stored inverted lockout plate on the left and right CDU's auxiliary drive pads.
Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Removal of CDU Switch Assembly (Ref. Fig. 801)

(1) Disconnect electrical harness from the switch assembly.

(2) Remove the switch assembly from the CDU by removing the four screws and washers.

NOTE : Exercise care when removing the switch assembly from the CDU as the tapered spring and washer may fall out.

(3) Retain the tapered spring and washer for reinstallation of switch assembly.

C. Installation of CDU Switch Assembly

CAUTION : ENSURE THAT THE TAPERED SPRING IS INSTALLED WITH THE LARGE END INTO THE CDU HOUSING.

(1) Install the tapered spring into the CDU housing and place the washer on the switch assembly housing where the tapered spring will contact.

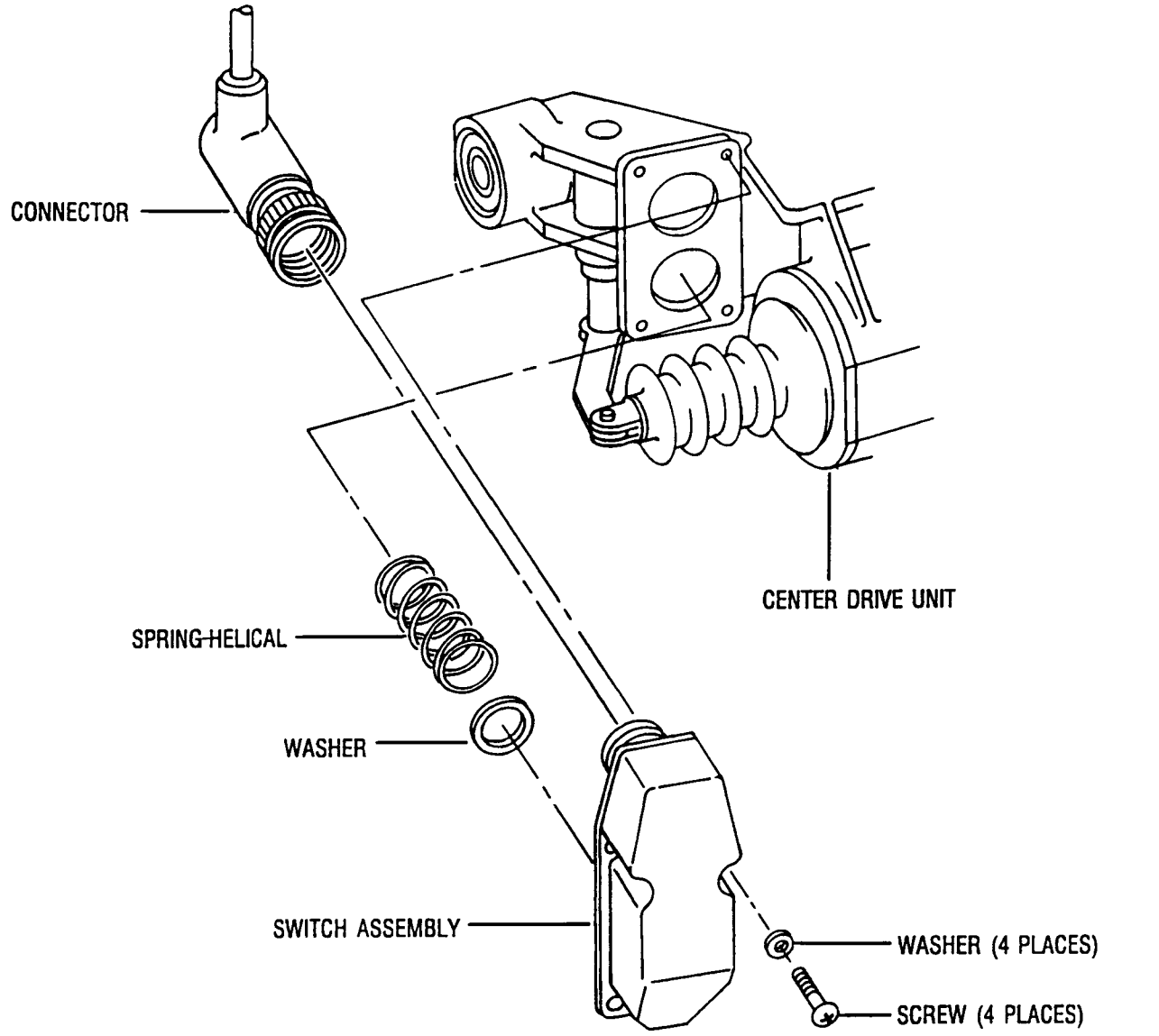
(2) Place the switch assembly onto the CDU and secure using the four screws and washers. TORQUE the screws to between 24 and 27 lbf.in. (0.27 and 0.31 m.daN).

(3) Connect the electrical harness to the switch assembly and tighten using soft jaw pliers to ensure that the connector is fully seated.

(4) Perform functional check (Ref. 78-31-00, P. Block 501).

D. Close-Up

(1) Remove bolts securing the lockout plate on the left and right CDU auxiliary drive pads. Install the lockout plate with the square drive



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Center Drive Unit Switch - Removal/Installation
Figure 801

exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Close thrust reverser cowl doors. Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).

BALLSCREW ACTUATOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Spanner Wrench
C.	Torque Wrench 150-210 lbf.in. (1.69-2.37 m. daN)
Referenced Procedures	
- 12-22-78, P. Block 1	Fan Thrust Reverser
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-03, P. Block 401	Angle Gearbox Assembly

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the appropriate circuits breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(2)Remove bolts securing stored inverted lockout plate on the left and right CDU auxiliary drive pads. Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(3)Remove angle gearbox and ballscrew actuator (Ref. 78-31-03, P. Block 401).

NOTE : Angle gearbox and ballscrew actuator must be removed as an assembly.

B. Removal (Ref. Fig. 401)

CAUTION : TO PREVENT POSSIBLE HARDWARE DAMAGE, DO NOT ATTEMPT REMOVAL OF THE BALLSCREW ACTUATOR FROM THE ANGLE GEARBOX FOR ANGLE GEARBOX/BALLSCREW ACTUATORS WITH GENERAL ELECTRIC SB 78-024 (ONE PIECE CONFIGURATION) ; SHOP-LEVEL MAINTENANCE REQUIRED.

NOTE : For angle gearbox/ballscrew actuators without General Electric SB 78-024 (two-piece configuration), the ballscrew actuator can be removed from the angle gearbox per the steps below.

(1)For Angle Gearbox/Ballscrew Actuators without General Electric SB 78-024 (two-piece configuration), remove the ballscrew actuator from the angle gearbox as follows :

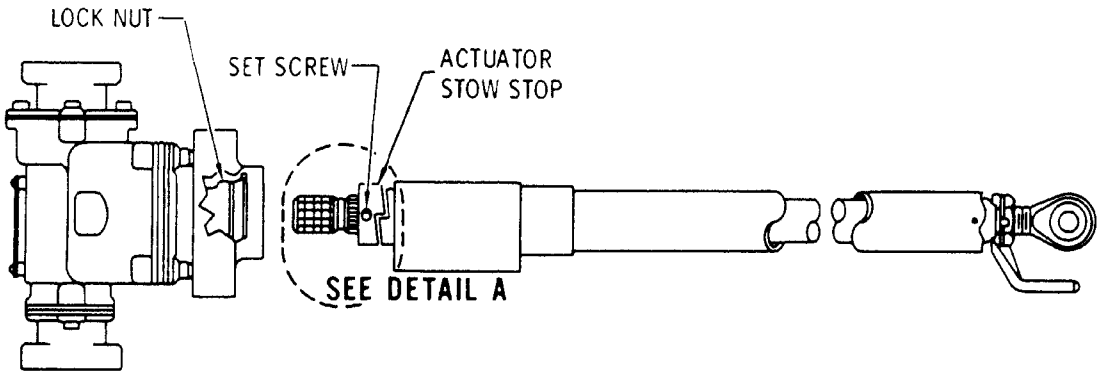
(a)Mark radial and axial location of stop with respect to ballscrew.

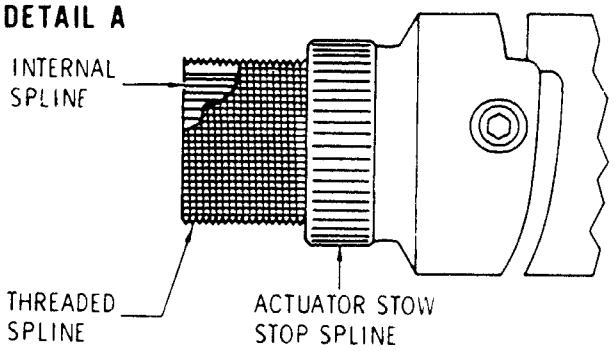
(b)Remove setscrew and carefully slide actuator stop toward rod-end.

(c)Using spanner wrench, MSE-43, release actuator by rotating ballscrew retaining nut while withdrawing actuator.

C. Installation (Ref. Fig. 401)

CAUTION : TO PREVENT POSSIBLE HARDWARE DAMAGE, DO NOT ATTEMPT INSTALLATION





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Assembly of Ballscrew Actuator in Gearbox
Figure 401

OF THE BALLSCREW ACTUATOR INTO THE ANGLE GEARBOX FOR ANGLE GEARBOX/BALLSCREW ACTUATORS WITH GENERAL ELECTRIC SB 78-024 (ONE PIECE CONFIGURATION) ; SHOP-LEVEL MAINTENANCE REQUIRED.

NOTE : For angle gearbox/ballscrew actuators without General Electric SB 78-024 (two-piece configuration), the ballscrew actuator can be installed into the angle gearbox per the steps below.

(1)For Angle Gearbox/Ballscrew Actuators without General Electric SB 78-024 (two-piece configuration), install the ballscrew into the angle gearbox as follows :

(a)Mark radial and axial location of ballscrew actuator stop with respect to ballscrew.

NOTE : Ballscrew stroke length is preset to 22.14 ± 0.010 in. (562.35 ± 0.254 mm), (88.56 revolutions ± 6.0 degrees).

(b)Remove actuator stop setscrew and carefully slide stop toward rod-end bearing. This will provide wrench clearance.

(c)Thread gearbox ballscrew retaining nut onto ballscrew actuator threads. Using spanner wrench MSE-43, TORQUE nut to 150 lbf. in. (1.69 m.daN).

(d)Back off locknut and TORQUE to 150 lbf. in. (1.69 m.daN) a minimum of 3 times to assure ballscrew is fully seated.

(e)Using spanner wrench MSE-43, TORQUE to 150 lbf. in. (1.69 m.daN).

CAUTION : MAKE CERTAIN THAT ACTUATOR IS COMPLETELY BOTTOMED IN GEARBOX.

(f)Slide actuator stow stop into splined ID of gearbox lock nut. Make sure stop is aligned on previously marked locations.

CAUTION : DO NOT TIGHTEN LOCK NUT MORE THAN 210 LBF. IN. (2.37 m.daN).

(g)If stop OD serrations interfere with lock nut ID serrations, apply additional torque to nut until serrations match up. Do not exceed 210 lbf. in. (2.37 m.daN).

(h)Install actuator stop setscrew. Tighten until screw bottoms completely.

(i)Lubricate actuator, as required, with grease (Ref. 12-22-78, P. Block 1).

(j)Test the assembled gearbox and ballscrew actuator as follows :

1 Mount the trunnion of the gearbox in a stationary mount and mount the rod-end bearing of the ballscrew actuator on an axially movable support.

2 Using a 0.20 in. (5.1 mm) square drive inserted into either of the gearbox flex shaft output pads, manually translate the ballscrew actuator toward deploy.

3 Using a dial indicator, take a runout reading on the ballnut at three different points of travel during actuator translation. Take the first reading at a point 2.0 in. (50.8 mm) from the stow stop ; the second at approximately 11.0 in. (279.4 mm) of travel and third at 2.0 in. (50.8 mm) from the deploy stop.

4 The runout should not exceed 0.020 in. (0.51 mm) at any of the three check points. Any reading greater, requires that the ballscrew actuator and gearbox assembly be returned to an overhaul facility to determine the cause of the condition.

D. Close-Up

(1)Install angle gearbox and ballscrew actuator (Ref. 78-31-03, P. Block 401).

(2)Remove bolts securing the lockout plate on the left and right CDU auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU manuel drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(4)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref.71-13-00, P. Block 301).

BALLSCREW ACTUATOR - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-02, P. Block 401	Ballscrew Actuator

2. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors.

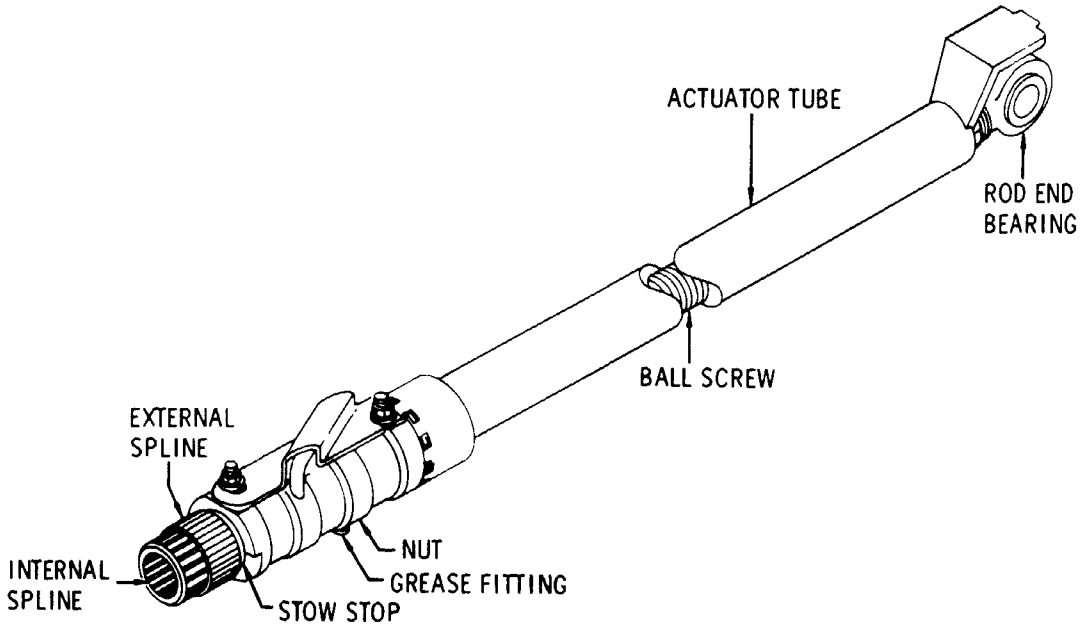
(2) Remove ballscrew actuator (Ref. 78-31-02, P. Block 401).

B. Visual Inspection/Check (Ref. Fig. 601)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Rod-End Bearings for :		
(a) Wear	0.010 inch (0.25 mm) end play maximum	Replace rod-end bearing if maximum wear limit is exceeded or is not free to rotate
(b) Nicks, scratches, scoring or cross threading	Any amount of minor damage provided uniball rotates freely	Minor damage may be polished with abrasive cloth ; no cross threading allowed, replace rod-end bearing
(2) Ballscrews for :		
(a) Grooves in ballscrews for evidence of brinnelling or pitting	None allowed	Replace ballscrew actuator (Ref. 78-31-02, P. Block 401).
(3) Actuator Tube Surfaces for :		
(a) Nicks, dents, or scratches	Any amount of minor damage	0.030 inch (0.75 mm) maximum depth must not cause erratic actuator operation

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(b)Cracks	None allowed	Replace actuator (Ref. 78-31-02, P. Block 401)

C. Close-Up
(1)Install ballscrew actuator (Ref. 78-31-02, P. Block 401).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).



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Ballscrew Actuator - Inspection/Check
Figure 601

ANGLE GEARBOX ASSEMBLY - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. 2C6367	Tool Install/Remove - Pin, Fan Reverser Actuator
C.	Corrosion Resistant Steel Lockwire
D. Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
E. Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
F. Material No.C02-027	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
G. Material No.C02-057	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
R H. Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 78-31-02, P. Block 401	Ballscrew Actuator
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

2. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuits breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal (Ref. Fig. 401)

NOTE : The actuator angle gearbox and ballscrew actuator must be removed as an assembly.

(1) Remove transcowl clevis pin cover screws and cover plate.

(2) Release center drive unit brake by pulling handle out, away from CDU (approximately 60°) until a flat is felt.

(3) Remove two bolts securing lockout plate (on CDU) and remove plate.

(4) Install a 0.25 in. (6.35 mm) square drive handle into the auxiliary drive pad. Crank reverser toward deploy far enough to expose the ballscrew actuator clevis pin.

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(5) Install the lockout plate square drive into the manual drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

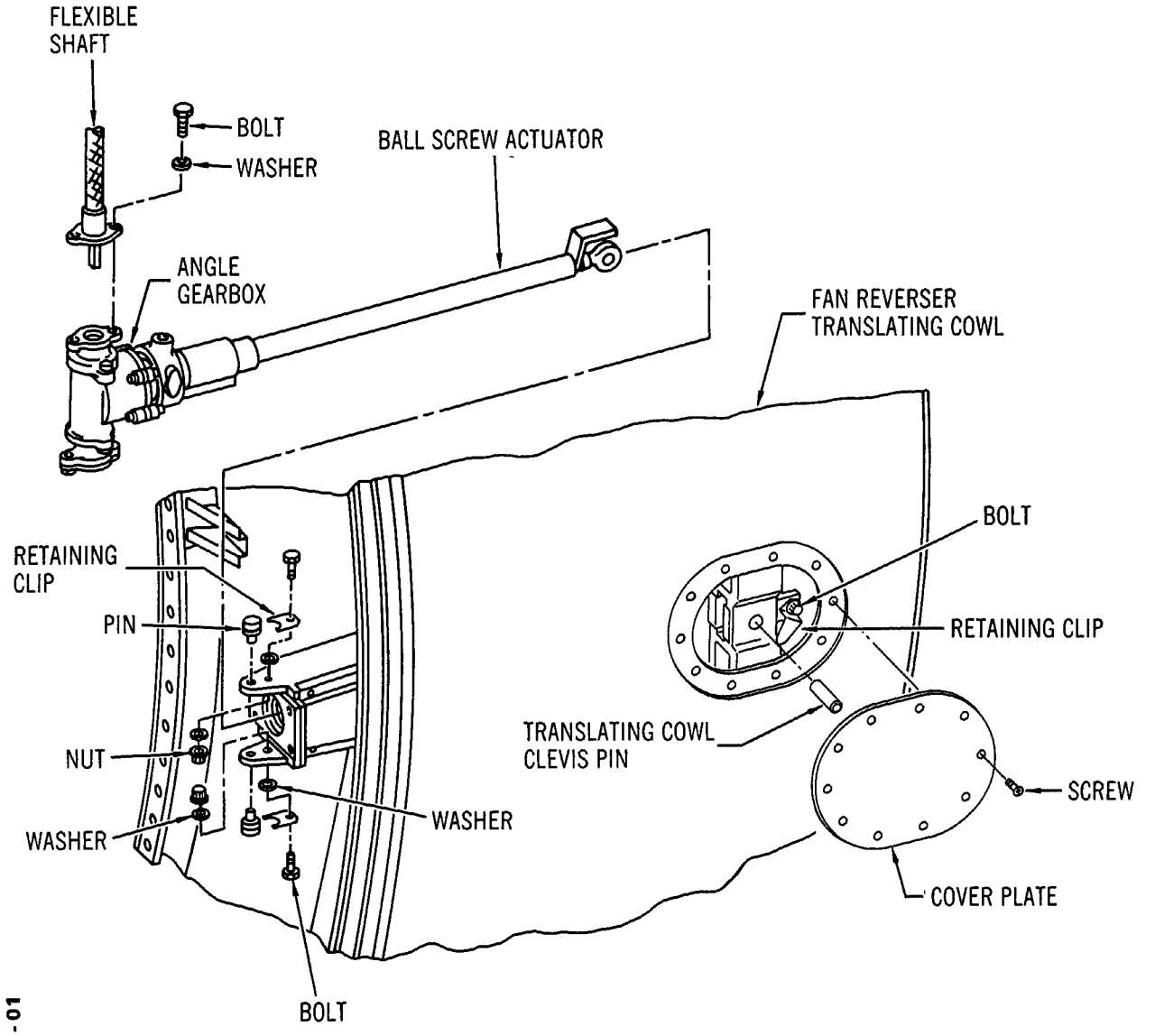
(6) Open quick release clamps securing flexshafts.

R (7) Remove bolts attaching flexshaft to the angle gearbox.

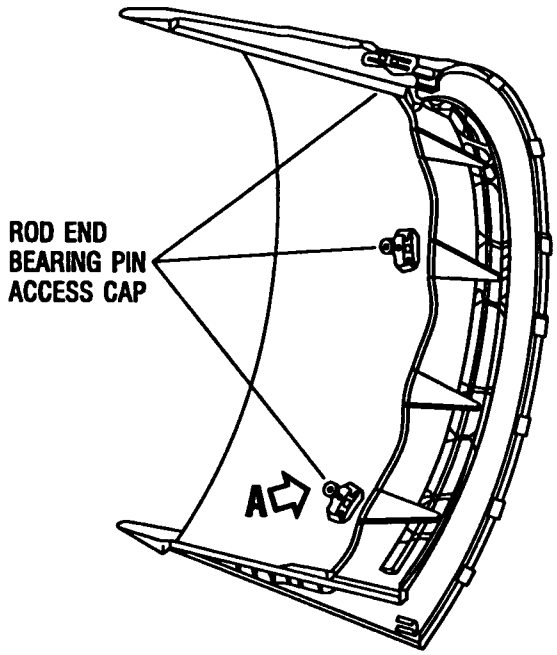
CAUTION : EXERCISE CARE TO PREVENT UPPER FLEXSHAFT CORE FROM SLIDING OUT OF THE SHEATH.

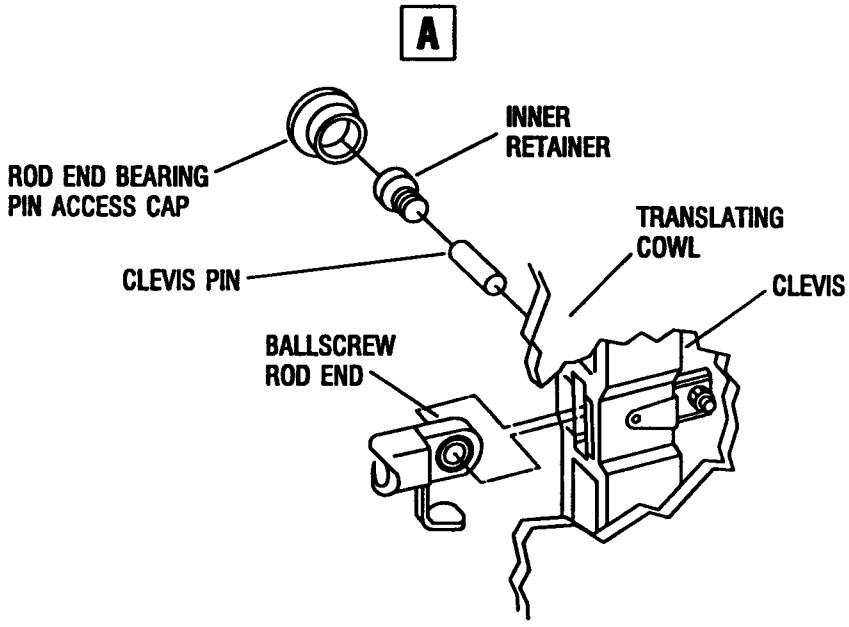
(8)Pull flexshaft from gearbox and stow to prevent core from sliding out.
CAUTION : DO NOT REMOVE CLEVIS PIN RETAINING CLIP BOLT. BACK BOLT OUT ONLY ENOUGH TO ROTATE RETAINING CLIP. REMOVAL OF BOLT WILL DAMAGE NUT PLATE.
(9)Loosen bolt securing retaining clip, turn retaining clip 90°.
(10)Remove internally threaded clevis pin by inserting slide hammer tool 2C6367 and tapping pin out.
(11)If the translating cowl clevis pin cannot be removed from the outer side of the translating cowl, use the following procedure to remove the clevis pin from the inner side of the translating cowl (Ref. Fig. 402). Otherwise, go to paragraph (12).
(a)Get access to the inner side of the translating cowl.
(b)Remove the sealant and get access to the rod end bearing pin access cap at the ballscrew actuator.
(c)Remove the rod end bearing pin access cap.
(d)Remove the inner retainer.
(e)Use the pin install/remove tool 2C6367 to remove the clevis pin that attaches the ballscrew actuator to the translating cowl.
(12)Remove bolts, washers and nuts from actuator pin retaining clips.
(13)Remove clips and mounting pins.
(14)Carefully remove gearbox-ballscrew assembly.
Pre SB GE 78-152
(15)Measure and record distance from centerline of gearbox gimbal mounting hole to the centerline of the ballscrew rod-end bearing with the ballscrew fully retracted.
End Pre SB GE 78-152
Pre SB GE 78-024
(16)Remove ballscrew actuator from gearbox if necessary (Ref. 78-31-02, P. Block 401).

C. Installation (Ref. Fig. 401)
NOTE : It is acceptable to use a fixed-length (Post SB 78-152) upper or lower angle gearbox and an adjustable-length (Pre SB 78-152) upper or lower angle gearbox on the same thrust reverser half if you use the correct procedure to set the translating cowl stop gap (Ref. 78-31-00, P. Block 501).
NOTE : You must do SB 78-152 before you install a fixed-length angle gearbox on a thrust reverser half. It it necessary to use shims with the fixed-length angle gearbox for adjustment between the translating cowl and the fixed structure. Longer bolts are necessary at the actuator mount because of the thickness added by the shims.
(1)Install ballscrew actuator in gearbox (Ref. 78-31-02, P. Block 401).
End Pre SB GE 78-024
Pre SB GE 78-152
CAUTION : IN THE FOLLOWING STEP, AFTER THE ROD-END BEARING HAS BEEN ADJUSTED, A 0.055 IN. (1.40 MM) DIA. PIN MUST NOT BE ABLE TO PASS THROUGH THE WITNESS HOLE.
R Pre MRAS SB 78-1028
R (2)Adjust the rod-end bearing to make the ballscrew actuator the same
R length as the removed actuator. Refer to the information recorded in
R step B.(15). After the completion of the rod-end adjustment, tighten



Actuator Angle Gearbox
Figure 401





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Clevis Pin - Alternative Removal Method
Figure 402

the jam nut. Do not let the rod end turn while you tighten the jam nut. TORQUE the jam nut to between 180 and 220 lbf.in. (2.03 and 2.48 m.daN) and wirelock.

End Pre MRAS SB 78-1028

Post MRAS SB 78-1028

(2)Adjust the rod-end bearing to make the ballscrew actuator the same length as the removed actuator. Refer to the information recorded in step B.(15). After the completion of the rod-end adjustment, tighten the jam nut. Do not let the rod end turn while you tighten the jam nut. TORQUE the jam nut to between 500 and 520 lbf.in. (5.65 and 5.88 m.daN) and wirelock.

End Post MRAS SB 78-1028

End Pre SB GE 78-152

(3)Position rod-end through protective pan and towards the transcowl clevis.

(4)Insert transcowl clevis pin.

NOTE : If the clevis pin was removed from the inner side of the translating cowl, do steps 2.C.(7) through 2.C.(7)(h).

(5)Position retaining clip over clevis pin and TORQUE bolt to between 55 and
R 70 lbf.in. (0.62 - 0.79 m.daN). Install lockwire (Material No. C10-071)
R through the head of the bolt and around the retaining clip.

CAUTION : DO NOT TORQUE THE TRANSCOWL COVER PLATE SCREWS MORE THAN THE SPECIFIED TORQUE VALUE. TOO MUCH TORQUE ON THE SCREWS CAN CAUSE CRACKS IN THE ACCESS PANEL.

(6)Install the transcowl cover plate. TORQUE the screws to between 22 and 27 lbf. in (0.24 and 0.30 m.daN).

(7)If the clevis pin was removed from the inner surface of the translating cowl, install the clevis pin as follows (Ref. Fig. 402). Otherwise, go to paragraph (8).

(a)Align the ballscrew rod end bolt hole with the translating cowl clevis bolt hole.

(b)Get access to the inner surface of the translating cowl. Install the clevis pin through the ballscrew rod end bolt hole and the clevis bolt hole.

WARNING : MATERIAL NO.C02-057 IS AN AGENT THAT IS AN IRRITANT, MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-057 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-057 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(c)Lubricate the threads of the inner retainer with Material No.C02-057.

(d)Install the inner retainer.

WARNING : MATERIAL NO.C02-027 IS AN AGENT THAT IS POISONOUS, CARCINOGENIC, AN ASPHYXIANT, AND AN IRRITANT, MAKE SURE ALL

PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-027 IS USED.
- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAME.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-027 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(e)Lubricate the threads of the rod end bearing pin access cap with Material No.C02-027.

(f)Install the rod end bearing pin access cap.

(g)TORQUE the rod end bearing pin access cap to between 76 and 100 lbf.in. (0.86 and 1.13 m.daN).

WARNING : MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(h)Apply Material No.C01-073 or Material No.C01-115 fully on the rod end bearing pin access cap.

CAUTION : THE GEARBOX NAMEPLATE MUST FACE INBOARD TO ASSURE PROPER INSTALLATION.

(8)Install mounting pins through bracket into gearbox.

(9)Install retaining clips with washer under clip and secure with bolts, washers and nuts.
TORQUE bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(10)Insert flexshaft into upper or lower angle gearbox as applicable and install attaching bolts. TORQUE bolts to between 33 and 37 lbf.in.
R (0.37 and 0.42 m.daN).

(11)Secure flexshaft with quick release clamps.

(12)Remove two bolts securing the lockout plate (on CDU) and remove plate.

(13)Rig reverser actuation system (Ref. 78-31-00, P. Block 501).

D. Close-Up

(1)Install the lockout plate with the square drive exposed onto the CDU manual drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(2)Make certain that working area is clean and clear of tools and

miscellaneous items of equipment.

(3)Remove safety clips and tags and close circuit breakers.
Close, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

ANGLE GEARBOX ASSEMBLY - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 78-31-03, P. BLock 401	Angle Gearbox Assembly
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuits breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Inspection/Check

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Drive sockets for end play	0.005 in. (0.127 mm) maximum	Replace gearbox (Ref. 78-31-03, P. Block 401).
(2) Mounting gimbals for wear	None allowed	Replace gearbox (Ref. 78-31-03, P. Block 401).
(3) Flexible shaft mating flanges for nicks or scratches	Any amount not exceeding 0.030 in. (0.75 mm) depth or diameter after removal of high metal and blending	Replace gearbox (Ref. 78-31-03, P. Block 401).
(4) Bolt holes for cracks	None allowed	Replace gearbox (Ref. 78-31-03, P. Block 401).
(5) Housing for nicks, dents, or scratches	Any number not exceeding 0.030 in. (0.75 mm) depth or diameter after removal of high metal	Replace gearbox (Ref. 78-31-03, P. Block 401).

C. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Remove safety clips and tags and close circuit breakers. Close, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

ACTUATOR-ANGLE GEARBOX - APPROVED REPAIRS

1. General
This procedure pertains to the approved repairs for the Actuator-Angle Gearbox. Access to the angle gearbox is gained by opening either of the two reverser halves.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C01-087	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.
(2)Remove bolts securing stored inverted lockout plate on the left and right CDU's auxiliary drive pads.
Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Repair of Damaged Inserts
(1)Coat new insert pin with Material No.C01-087 and install.
(2)Remove insert tang when insert is 1/4 to 1/2 turn below the countersink.
(3)Allow primer to cure at room temperature for 24 hours before using insert.

C. Close-Up
(1)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.

CDU SWITCH ASSEMBLY - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench 33-37 lbf.in. (0.37 - 0.42 m.daN)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

2. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(2) Remove bolts securing stored inverted lockout plate on the left and right CDU's auxiliary drive pads.
Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Removal of CDU Switch Assembly (Ref. Fig. 401)

(1) Disconnect electrical harness from the switch assembly.

(2) Remove the switch assembly from the CDU by removing the four screws and washers.
NOTE : Exercise care when removing the switch assembly from the CDU as the tapered spring and washer may fall out.

(3) Retain the tapered spring and washer for reinstallation of switch assembly.

C. Installation of CDU Switch Assembly

CAUTION : ENSURE THAT THE TAPERED SPRING IS INSTALLED WITH THE LARGE END INTO THE CDU HOUSING.

(1) Install the tapered spring into the CDU housing and place the washer on the switch assembly housing where the tapered spring will contact.

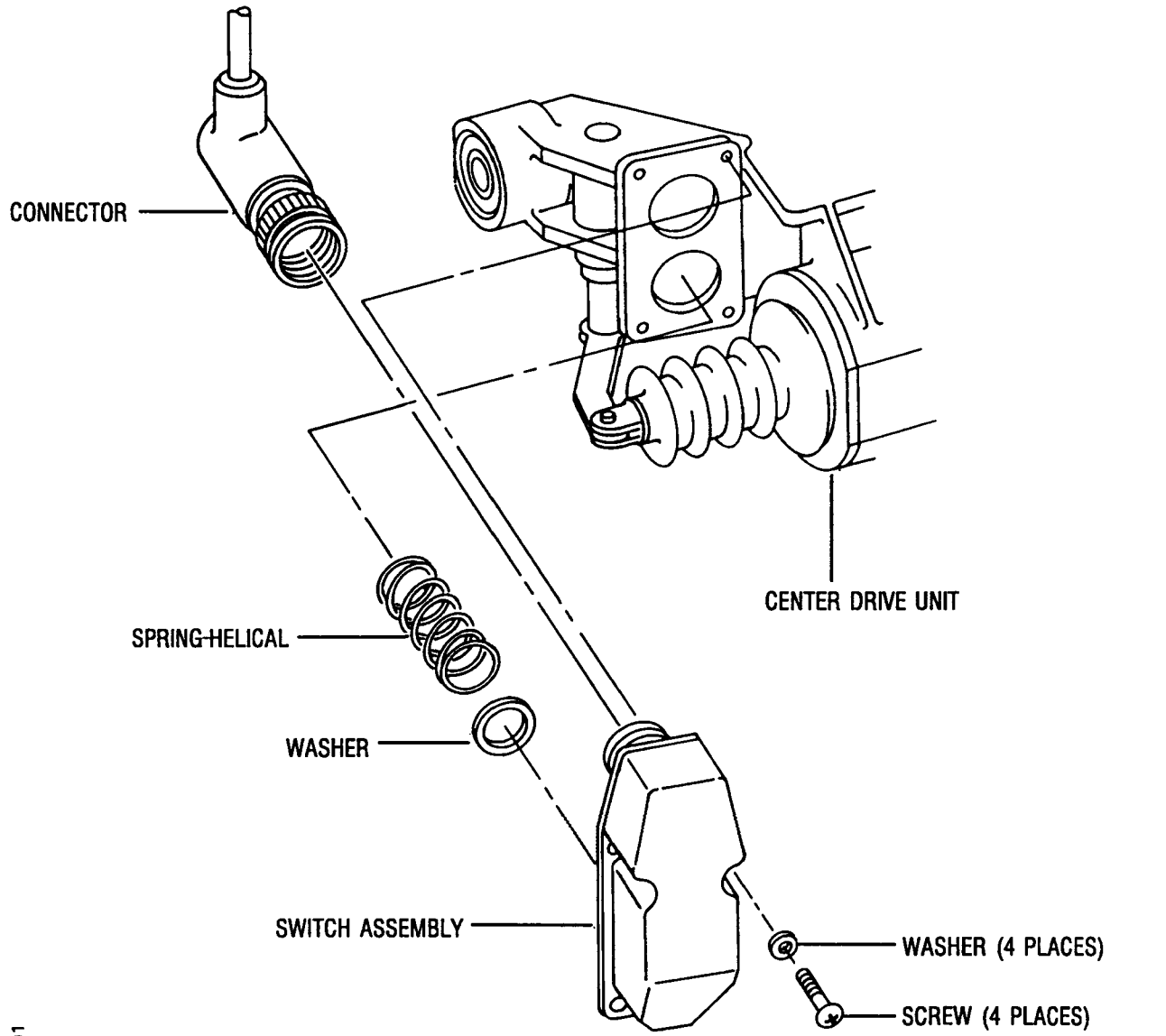
(2) Place the switch assembly onto the CDU and secure using the four screws and washers. TORQUE the screws to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(3) Do CDU Position Switch Module Functional Test (Ref. 78-31-00, P. Block 501).

(4) Connect the electrical harness to the switch assembly and tighten using soft jaw pliers to ensure that the connector is fully seated.

(5) Perform functional check (Ref. 78-31-00, P. Block 501).

D. Close-Up



Center Drive Unit Switch - Removal/Installation
Figure 401

(1)Remove bolts securing the lockout plate on the left and right CDU auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close thrust reverser cowl doors. Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).

**ON A/C 001-100,

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PRESSURE REGULATING AND SHUT-OFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure pertains to the removal and installation of the Pressure Regulating and Shut-off Valve.

B. Access to the Pressure Regulating and Shut-Off Valve is gained by opening the right side reverser half.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench 40-70 lbf. in. (0.45 - 0.79 m.daN)
C.	Corrosion Resistant Steel Lockwire
D.	Gaskets
E.	Warning Notices
Referenced Procedures	
- 36-11-00, P. Block 401	Engine Bleed Air Supply System
- 70-00-00, P. Block 201	Engine Standard Practices
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up
(1) Open, safety and tag the appropriate circuit breakers and open right fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2) On panel 436VU :
- Make certain that the APU Bleed Load Valve Control Switch (40HB) is in CLOSE position and install a warning notice to tell persons not to use it.
- Make certain that X BLEED VALVE Control Switch (39HB) is in CLOSE position and install a warning notice to tell persons not to use it.

(3) Make certain that a warning notice installed on the HP ground connector to tell persons not to use it.

B. Removal (Ref. Fig. 401)
(1) Disconnect the electrical connector from the Pressure Regulator and Shutoff-Valve (PRSOV).
(2) Remove the couplings and seals that connect the T/R valve air tubes to the intersect duct and the interface duct.
NOTE : T/R valve air tubes must be removed and inspected to prevent

preload on the PRSOV assembly during installation. A "preload condition" is a gap or a misalignment/sprung condition at the mating flanges larger than 0.050 in. (1.27 mm) for the T/R valve air tube connected to the intersect duct, and 0.100 in. (2.54 mm) for the T/R valve air tube connected to the interface duct.

(3)Remove the couplings and seals that connect the T/R valve air tubes to the Ground (Y)-Check Valve.
(4)Disconnect the TLOD pneumatic supply line from the Y-check valve.
(5)Remove the bolts from the Y-Check Valve at the inlet side. Keep the spacer and the nut plate retainers to use again. Discard the metal gasket. Remove the Y-Check Valve.
(6)Remove the bolts, nuts, washers, and the gasket from the outlet side of the PRSOV and remove the valve. Discard the metal gasket.
(7)Remove the PRSOV assembly brackets from the upper and lower link assemblies.
(8)Remove the upper and lower link assemblies from the T/R valve bracket.
(9)Measure each link assembly from center to center of the bolt holes. Adjust the upper link assembly to 2.56 in. (65 mm), and the lower link assembly to 2.68 in. (68 mm). TORQUE the jamnuts on the link assemblies to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN). Make certain the link shanks can be seen in the witness holes.

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C. Installation (Ref. Fig. 401, 402)

CAUTION : A NO-PRELOAD CONDITION MUST EXIST ON THE VALVE AFTER FINAL ASSEMBLY AND ADJUSTMENT. A PRELOAD CONDITION CAN CAUSE FAILURE OF THE T/R VALVE AIR TUBES AND SUBSEQUENT EMISSION OF HOT GASES INTO THE CORE AREA.

(1)Install the link assemblies in their correct positions on the PRSOV assembly brackets. TORQUE with bolts and nuts to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).
(2)Install the upper and lower link assemblies to the T/R valve bracket. Do not tighten at this time.
(3)Position the valve between flanges of the inlet and outlet ducts. Make certain valve is positioned with the outlet side facing inboard.
(4)Install the spacer and new metal gasket on the inlet side and new metal gasket on the outlet side.
(5)Install the bolts through the inlet side and the PRSOV assembly bracket to the Y-Check Valve. Do not tighten at this time.
(6)Install the bolts, washers, and nuts through the outlet flange and the PRSOV assembly bracket.
(7)TORQUE the inlet and outlet duct flange bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

CAUTION : THE T/R VALVE AIR TUBE CONNECTED TO THE INTERSECT DUCT IS NOT SYMMETRICAL. MAKE CERTAIN THAT THE TUBE ENDS ARE IDENTIFIED "DUCT END" AND "VALVE END" CORRECTLY BEFORE INSTALLATION.

(8)The T/R valve air tube connected to the intersect duct is stamped "Duct End" and "Valve End" during production. If the tube is stamped correctly, continue with step 3.C.(9). If the tube is not identified correctly, continue as follows.

(a)Place the T/R valve air tube flat on a pad of paper, or equivalent, with one of the two flanges in the lower left corner (Ref. Fig. 402).

NOTE : Make certain the bottom edge of the tube is lined up with the bottom edge of the pad.

(b)Draw a line that agrees with the outside angled edge of the T/R valve air tube (Ref. Fig. 402).

(c)Turn the T/R valve air tube to the opposite side and place it on the same pad with the line drawn. Draw another line that agrees with the outside angled edge of the tube (Ref. Fig. 402).

(d)Compare drawn lines. If the second line drawn forms a larger angle to the horizontal axis than the first line drawn, mark the upper flanged end "Duct End" and the lower left corner flange "Valve End" (Ref. Fig. 402) (Example A). If the second line drawn forms a smaller angle than the first line drawn, mark the upper flanged end "Valve End" and the lower left corner flange "Duct End" (Ref. Fig. 402) (Example B).

(e)Use the Temporary Ink Method and mark the T/R valve air tube (Ref. 70-00-00, P. Block 201). Make certain the identified ends agree (Ref. Fig. 402).

CAUTION : MAKE CERTAIN THAT THE T/R VALVE AIR TUBE IS INSTALLED CORRECTLY ; "DUCT END" TO INTERSECT DUCT, AND "VALVE END" TO THE PRESSURE REGULATOR AND SHUTOFF VALVE.

(9)Connect the T/R valve air tube to the intersect duct and the PRSOV with couplings and seals. Do not tighten couplings at this time.

(10)Connect the T/R valve air tube to the interface duct and the PRSOV with couplings and seals.

(11)TORQUE all couplings three times to between 40 and 50 lbf.in. (0.45 and 0.56 m.daN). Lightly hit the perimeters of the couplings with a soft-faced mallet while the coupling nut is torqued.

(12)Remove the bolts and nuts at the T/R valve bracket end of the link assemblies to make certain they are not compressed or expanded. Loosen jamnut and adjust if necessary. Make certain the link shanks can be seen in the witness holes. TORQUE the jamnut on the link assemblies to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

(13)TORQUE the nut that attaches the lower link assembly to the T/R valve bracket to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

CAUTION : TO PREVENT PRELOADING OF THE UPPER CLEVIS, MAKE CERTAIN THE CLEVIS EARS DO NOT BEND.

(14)Tighten the nut that attaches the upper link assembly to the T/R valve bracket until the nut is against the face of the clevis with a minimum of two bolt threads shown through the nut. Make certain the clevis ears do not bend.

(15)Remove all coupling clamps on the PRSOV/Ground Check Valve one at a time to check for preloading on the T/R valve air tubes.

NOTE : A "preload condition" is a gap or a misalignment/sprung condition at the mating flanges larger than 0.050 in. (1.27 mm) for the T/R valve air tube connected to the intersect duct, and 0.100 in.

(2.54 mm) for the T/R valve air tube connected to the interface duct.

(16)If preloading is found, lightly rotate the tube to eliminate preloading. More adjustment of the upper and lower link assemblies can be necessary (Ref. Step 3.C.(12)). Small adjustments of the link assemblies at the intersect duct can also be necessary (Ref. 36-11-00, P. Block 401).

(17)If the preloading condition is in limits, tighten the coupling clamps per step 3.C.(11) above.

(18)Remove the coupling clamp at the intersect duct end of the T/R valve air tube and make certain no preload is on the T/R valve air tube. Tighten the coupling clamp per step 3.C.(11) above.

(19)Install the TLOD supply line on the Y-check valve. TORQUE the nut to between 350 and 420 lbf.in. (3.92 and 4.70 m.daN). Lockwire the installation nut.

(20)Connect electrical connector and tighten by hand plus 1/8 turn.

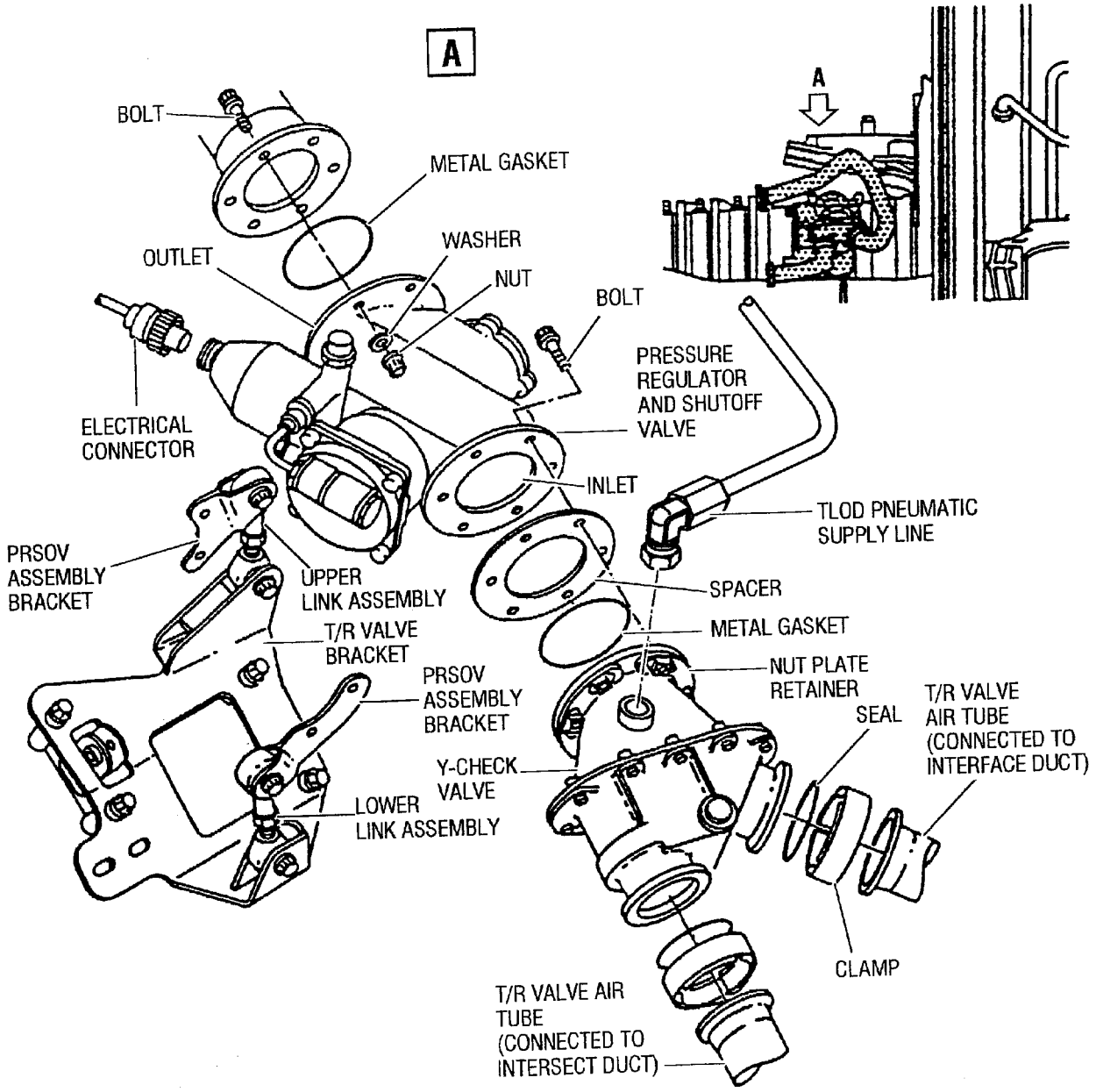
**ON A/C 001-100,

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

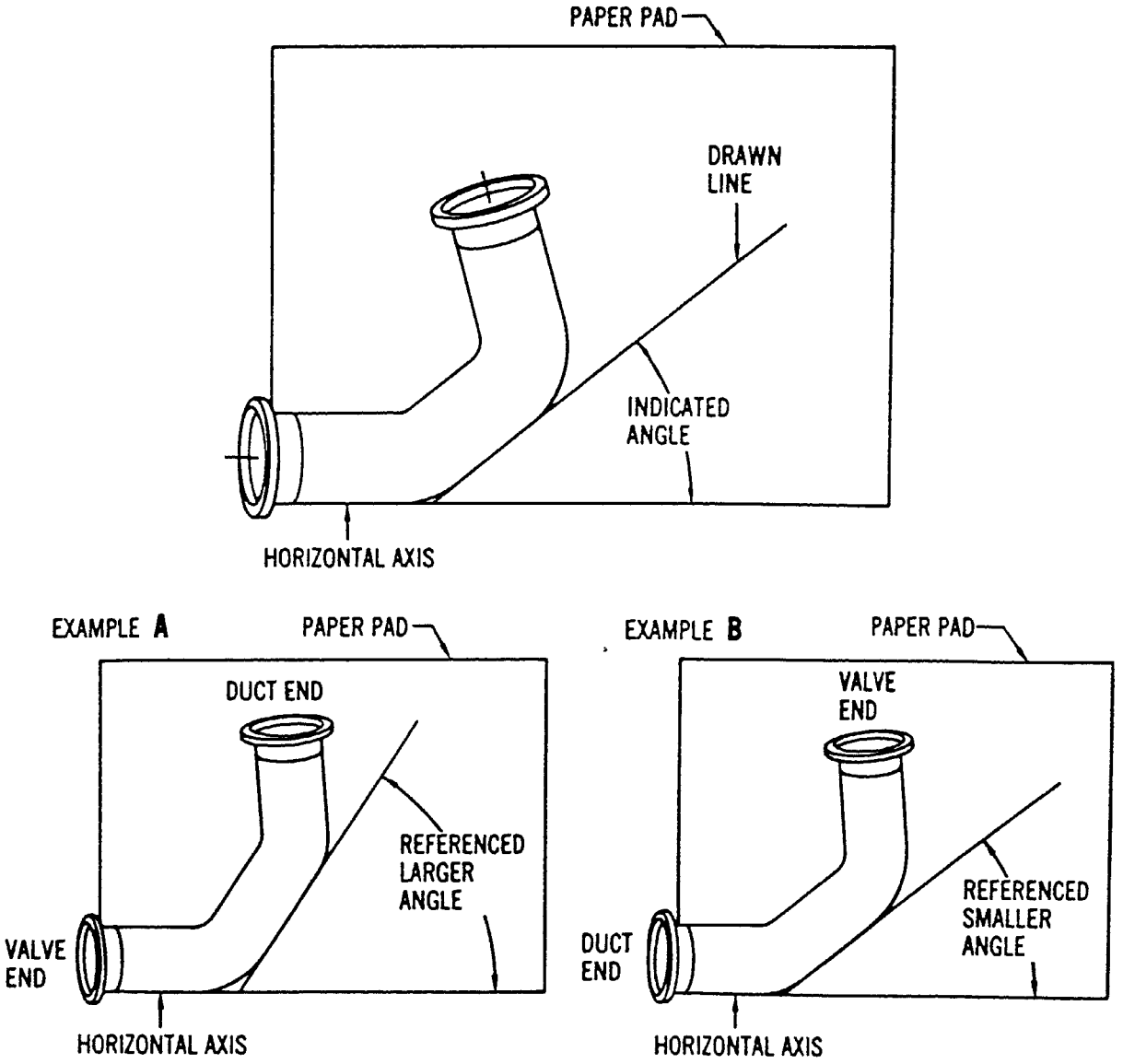
(2)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

(3)Remove warning notices from panel 436VU and HP ground connector.



BM5 78 31 05 4 LANO 00

Pressure Regulating and Shut-off Valve
Removal/Installation (Post TLOD)
Figure 401



BM5 78 31 05 4 LCMO - 00

T/R Valve Air Tube Orientation
Figure 402

PRESSURE REGULATING AND SHUT-OFF VALVE - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-05, P. Block 401	Pressure Regulating and Shut-off Valve

2. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open right fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

R (2) Remove pressure regulating and shut-off valve (Ref. 78-31-05, P. Block 401).

B. Visual Inspection/Check

Inspect/Check	Maximum Serviceable Limits	Remarks
(1) Mating flanges for nicks, dents, or scratches	Any number 0.010 inch (0.254 mm) deep not completely across mating surfaces	Replace valve (Ref. 78-31-05, P. Block 401)
(2) Mounting surfaces for nicks, dents, or scratches	Any amount not exceeding 10 percent of the flange thickness after removal of high metal and blending	Replace valve (Ref. 78-31-05 P. Block 401)
(3) Housing for nicks, dents, or scratches	Any amount not exceeding 10 percent of housing thickness	Replace valve (Ref. 78-31-05 P. Block 401)

C. Pressure Regulating and Shut-off Valve (PRSOV) Leak Check

(1) Remove the blue cap from the left-hand center drive unit (CDU). Remove the upstream end of the flexible inlet tube from the reverser supply manifold.

(2) Use the blue cap to cap the open male port where the flexible inlet tube was removed from the reverser supply manifold.

(3) Remove and keep the blue cap from the right-hand CDU.

(4) Put thin foil over the open -16 male fitting on the right-hand CDU.

(5) Attach the foil with tie wrap or other applicable material to keep leakage to a minimum.

(6) Remove the electrical cable from the directional pilot valve (DPV) solenoid to keep the possibility of an inadvertent deployment of the thrust reverser, while on the ground, to a minimum.

(7) Use a ground cart to apply 40 psig (276 kPa) of pressure to the

R environmental control system (ECS). Wait one minute.
R (8)Check the foil for bulges or ruptures. If there are bulges or ruptures, replace the pressure regulating and shut-off valve (Ref. 78-31-05, P. Block 401).
R (9)Release system pressure and remove the foil.
R (10)Put the blue caps on the right-hand and left-hand CDU.
R (11)Install the flexible inlet tube into the upstream end of the reverser supply manifold.
R (12)Install the electrical cable into the DPV solenoid.

R D. Close-Up
(1)Install pressure regulating and shut-off valve (Ref. 78-31-05, P. Block 401).
(2)Remove safety clips and tags and close circuit breakers. Close right thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

DIRECTIONAL PILOT VALVE - MAINTENANCE/PRACTICES

1. General

A. Maintenance procedures for the Directional Pilot Valve (DPV) are as follows :

(1)Removal/Installation, Inspection/Check, and Approved Repairs

R Pre MRAS SB 78-1137

(2)Moisture purge of the DPV pressure switch (introduced by SB 78A1118).

R NOTE : Accomplishment of SB 78-1137 eliminates the need to perform this moisture purge of the DPV pressure switch.

(a)Do this task to reduce the probability of DPV pressure switch malfunctions. Moisture can accumulate and freeze on the supply side of the DPV pressure switch and prevent the pressure switch from functioning correctly. If you purge moisture from the pressure switch at regular intervals, it will reduce the formation of ice in the pressure switch, and reduce the probability of pressure switch malfunctions.

R End Pre MRAS SB 78-1137

(3)DPV leak check

B. You can get access to the DPV through the left fan cowl.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Squeeze Bottle Certified for Flammable Liquids
C.	Bucket Certified for Flammable Liquids
D. Honeywell P/N 835695-1 or equivalent	Nozzle
E. Honeywell P/N S8990-604	Preformed Packing (if necessary)
F. Honeywell P/N S8157N422-003	Washer, 0.003 in. (0.08 mm) thick (if necessary)
G. Honeywell P/N S8157N422-005	Washer, 0.005 in. (0.13 mm) thick (if necessary)
H. Honeywell P/N S8157N422-010	Washer, 0.010 in. (0.25 mm) thick (if necessary)
I. Honeywell P/N S8157N422-020	Washer, 0.020 in. (0.51 mm) thick (if necessary)
J.	TORQUE wrench, 200-300 lbf.in. (2.3-3.4 m.daN)
K.	Corrosion Resistant Steel Lockwire
L.	Pressure source with regulator - 100 psig (690 kPa)
M.	Pressure gage, 0-100 psig (0-690 kPa) or 0-150 psig (0-1035 kPa) ± 10% full scale accuracy
N.	Pressure gage, 0-15 psig (0-103.5 kPa) ± 5% (recommended) or 0-30 psig (0-207 kPa) ± 5% full scale accuracy, able to withstand

ITEM	DESIGNATION
	100 psig (690 kPa)
O.	Flexible hose with -5 AN coupling nut
P.	Flexible hose with -4 AN coupling nut
Q.	Reducer fitting(s)
R.	Tee fitting
S.	Drill, No. 70
T. MS9315-04, AN929-4, or equivalent	Cap assembly
U. Material No.C04-003	Cleaning Compounds and Solvents (Ref. 70-00-00)
V. Material No.C05-005	Inspection and Marking Compounds (Ref. 70-00-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power
- 36-00-00, P. Block 1	Pneumatic
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System
- 78-31-00, P. Block 901	Thrust Reverser System

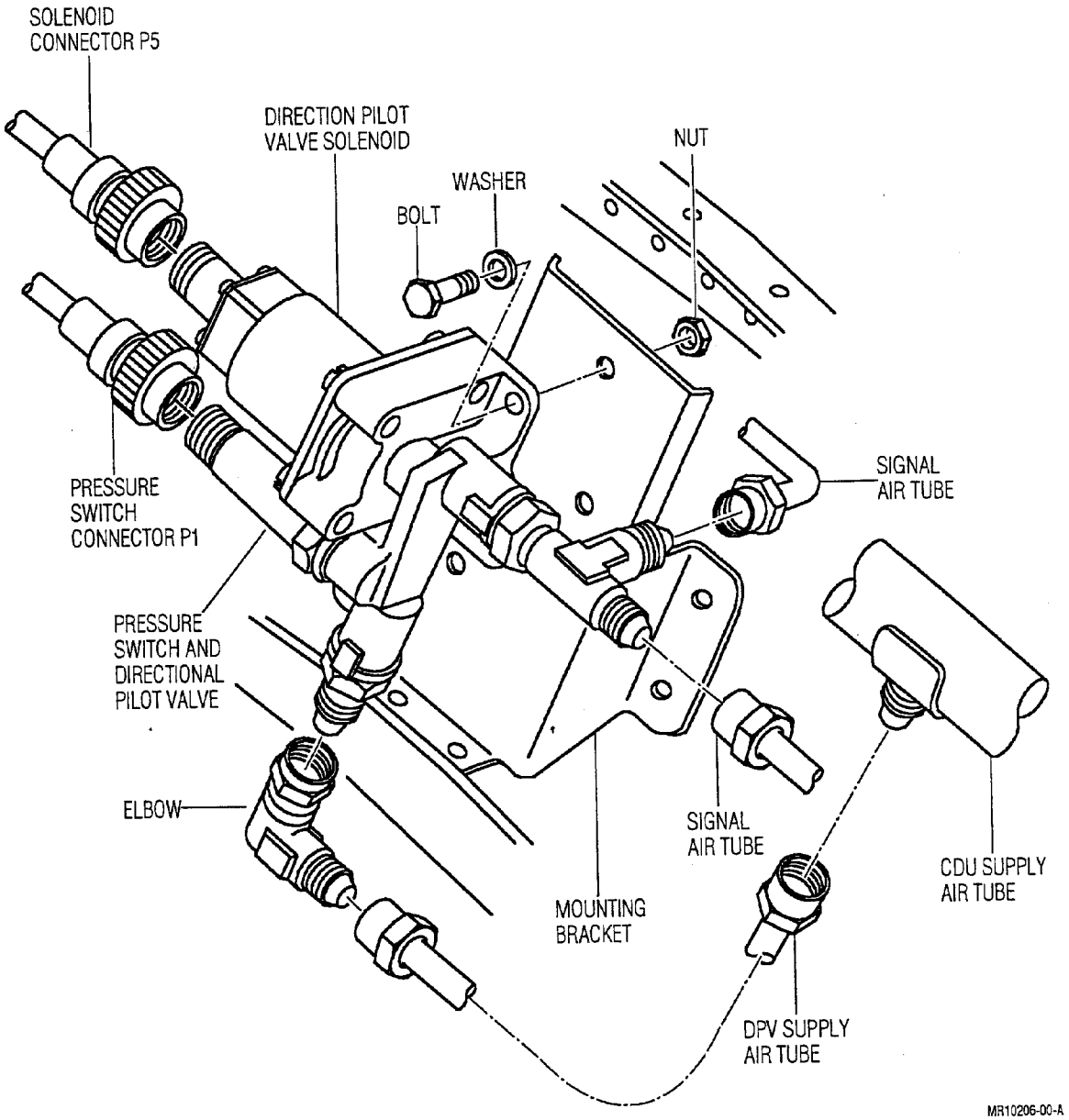
3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal
R (Ref. Fig. 201) for Pre MRAS SB 78-1137
R (Ref. Fig. 202) for Post MRAS SB 78-1137
(1)Disconnect electrical connectors from pressure switch and valve connectors.
(2)Disconnect pneumatic tubes.
(3)Remove bolts and flatwashers and remove valve.

C. Inspection/Check

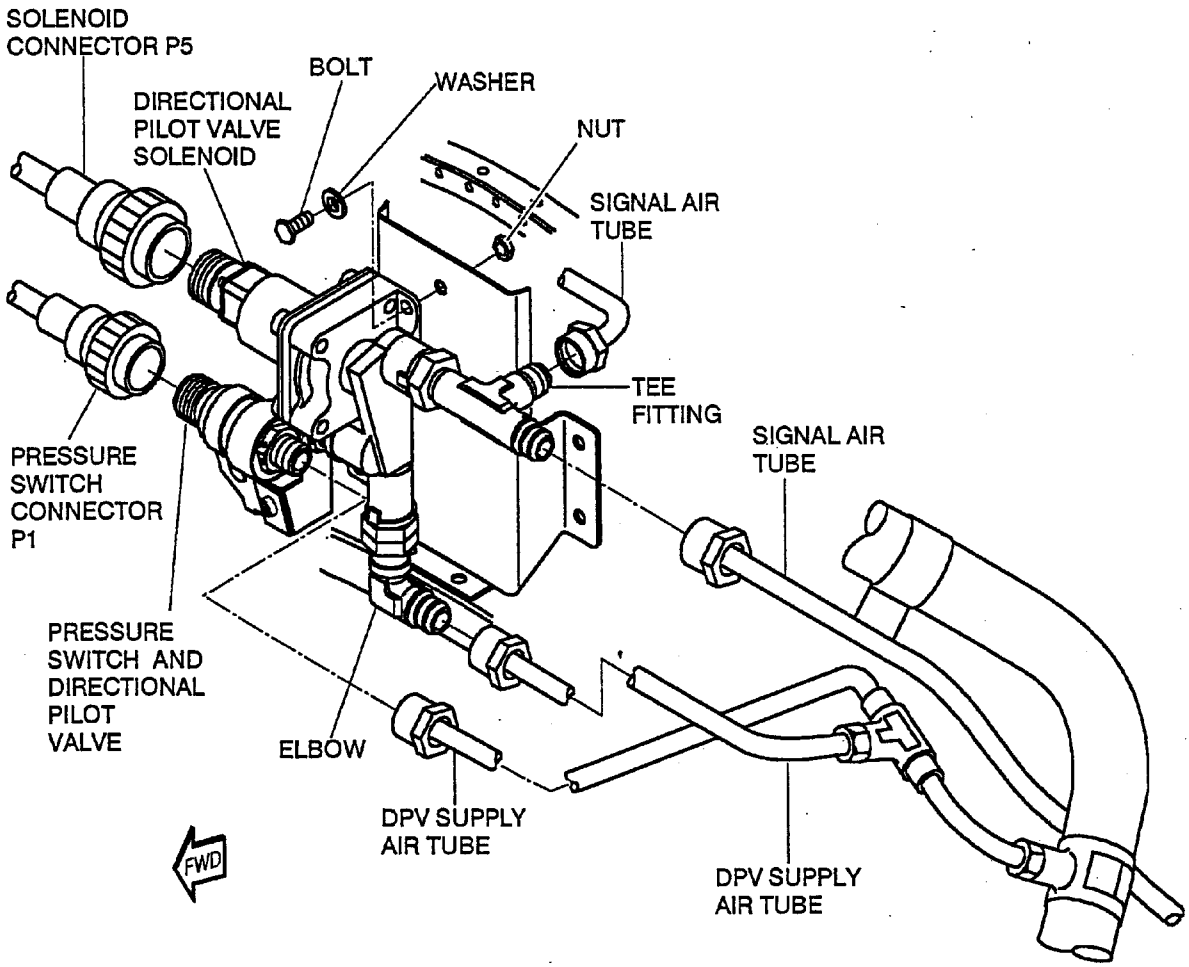
INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Valve for :		
(a) Thread damage	30 percent on one entrance thread or 10 percent damage on each of 2 entrance threads	Repair per paragraph D
(b) Cracks	None allowed	Replace valve
(2) Electrical Connector for :		
(a) Thread damage	Total of one full thread may be missing after chasing	Chase threads or replace valve
(3) Housing for nicks, dents or scratches	Any amount not exceeding ten percent of housing thickness	Replace valve



BM5 78 31 06 2 LAMD 04

Pressure Switch and Directional Pilot Valve
Removal/Installation - Pre MRAS SB 78-1137
Figure 201

R



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Pressure Switch and Directional Pilot Valve
Removal/Installation - Post MRAS SB 78-1137
Figure 202

R

D. Approved Repairs
(1)Thread damage repair.
(a)Blend damaged threads within serviceable limits with a fine stone.

R Pre MRAS SB 78-1137
E. Moisture Purge of the DPV Pressure Switch
R NOTE : Accomplishment of SB 78-1137 eliminates the need to perform this moisture purge of the DPV pressure switch.
(1)With the Directional Pilot Valve (DPV) removed from the thrust reverser, record the position of the electrical connector key on the DPV pressure switch. You vill need this information later (Ref. Fig. 203).
(2)Remove the pressure switch from the DPV, and install a protective cap in the opening of the DPV housing assembly.
(3)Remove the preformed packing and the washer(s) from the pressure switch. Use care when you remove the preformed packing. Keep the preformed packing and the washer(s) for later use.
WARNING : THIS MATERIAL IS FLAMMABLE. DO NOT USE IT NEAR FLAMES OR HEAT. THIS MATERIAL IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE MATERIAL IN AN AREA WITH GOOD AIR FLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE MATERIAL ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.
(4)Get a squeeze bottle that is certified for use with flammable liquids. Fill the bottle with acetone (Material No.C04-003, or equivalent).
(5)Turn the pressure switch so that the inlet points up. Inject the acetone (Material No.C04-003 or equivalent) into the pressure switch inlet until the inlet is almost full.
(6)Cover the pressure switch inlet. Shake the pressure switch vigorously.
(7)Pour the liquid into a bucket that is certified for use with flammable liquids.
(8)Do steps (5) though (7) again. Make sure that you remove as much of the acetone as possible from the pressure switch when the procedure is complete.
WARNING : THIS MATERIAL IS FLAMMABLE. DO NOT USE IT NEAR FLAMES OR HEAT. THIS MATERIAL IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE MATERIAL IN AN AREA WITH GOOD AIR FLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE MATERIAL ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.
(9)Install a nozzle (P/N 835695-1 or equivalent) onto a pressure gun that is connected to a dry nitrogen source. The dry nitrogen source must be regulated to between 25 and 30 psig (172 and 207 kPa).
NOTE : You can locally make a nozzle equivalent to P/N 835695-1 (Ref. Fig. 204).
CAUTION : MAKE SURE THE NOZZLE DOES NOT TOUCH THE BOTTOM OF THE PRESSURE SWITCH INLET. IF IT DOES, THE LIQUID WILL NOT BE FULLY REMOVED FROM THE PRESSURE SWITCH.

CAUTION : BE CAREFUL NOT TO DAMAGE THE PRESSURE SWITCH WHEN YOU INSERT THE NOZZLE.

(10)Gently insert the nozzle into the pressure switch inlet until you feel the nozzle touch the bottom of the switch. Pull the nozzle out approximately 0.10 in. (2.5 mm).

WARNING : COMPRESSED NITROGEN CAN CAUSE BURNS, AND CAN CAUSE PARTICLES TO BECOME LOOSE IN THE AIR. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.

(11)Turn the pressure switch so that the inlet points down. Apply dry nitrogen for a minimum of four minutes. Make sure that as much liquid as possible is bled from the pressure switch.

(12)Use clean cloths to remove all remaining liquid from the outer surface of the pressure switch.

(13)Install the preformed packing that you removed. If the preformed packing is damaged, replace it with new preformed packing.

(14)Remove the protective cap from the opening in the DPV housing assembly, and install the pressure switch into the housing assembly with the washers that you removed. Use a sufficient number of washers to put the pressure switch electrical connector key within 10 degrees of the position you recorded in step E.(1).

(15)TORQUE the DPV pressure switch to between 200 and 300 lbf.in. (2.26 and 3.39 m.daN). Make sure the pressure switch electrical connector key is within 10 degrees of the position you recorded in step E.(1). Safety the DPV pressure switch with lockwire.

R End Pre MRAS SB 78-1137

F. Installation

R (Ref. Fig. 201) for Pre MRAS SB 78-1137

R (Ref. Fig. 202) for Post MRAS SB 78-1137

(1)Put valve on its mounting bracket and attach it with bolts and flat washers. Tighten the bolts hand tight only.

(2)Remove protective caps and plugs from the electrical connectors and fittings.

(3)Install the elbow (if removed) on the valve and TORQUE the nut to between 155 and 175 lbf.in. (1.75 and 1.98 m.daN).

(4)Install the tee fitting (if removed) on the valve and TORQUE the nut to between 135 and 150 lbf.in (1.53 and 1.70 m.daN).

(5)Connect the DPV supply air tube and TORQUE the coupling nuts to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN) and wirelock.

(6)Connect the signal air tubes to the tee-fitting and TORQUE coupling nuts to between 135 and 150 lbf.in. (1.53 and 1.70 m.daN) and wirelock.

R Post MRAS SB 78-1137

(7)Connect the pneumatic tube to the pressure switch and TORQUE coupling nut to between 135 and 150 lbf.in. (1.53 and 1.70 m.daN) and lockwire (Ref. Fig. 202).

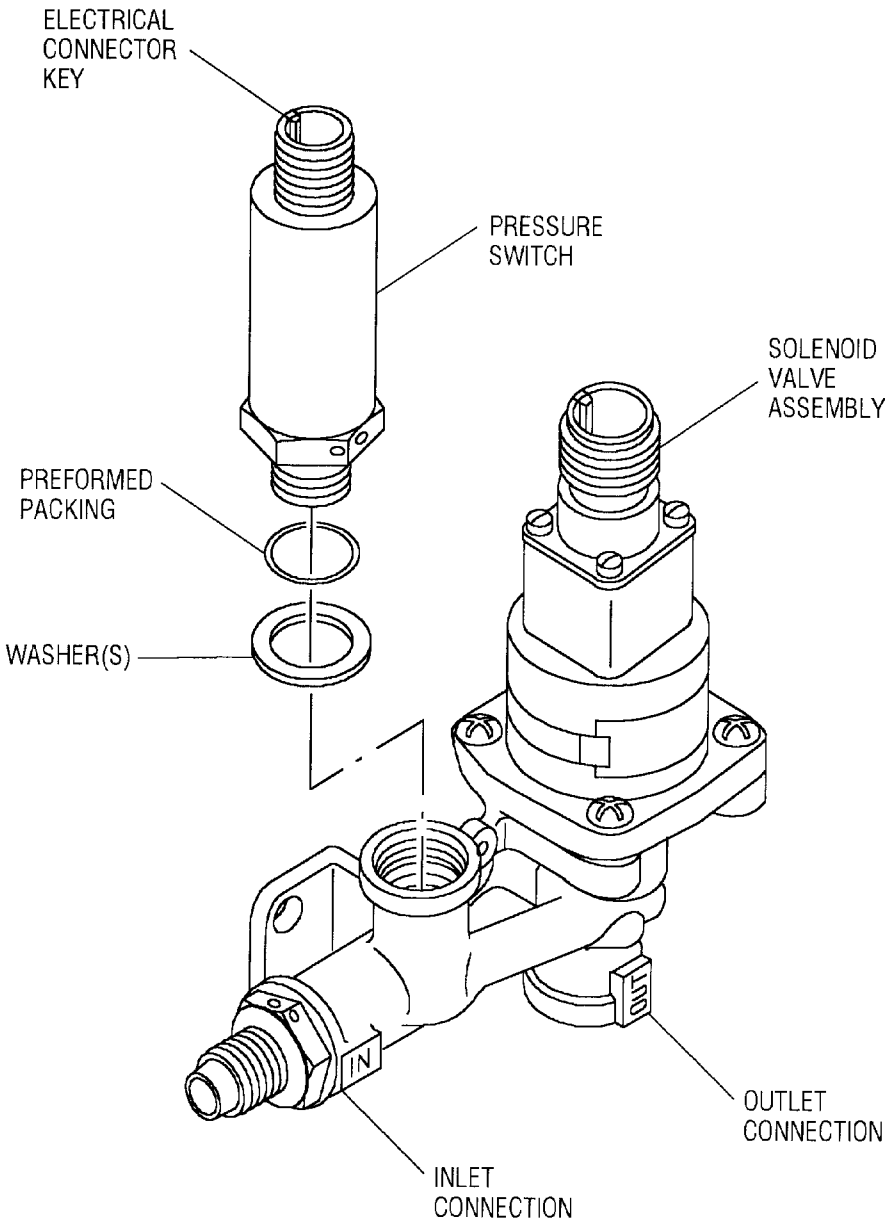
R End Post MRAS SB 78-1137

(8)Connect electrical connectors to switch and valve. Tighten (use soft jaw pliers) to ensure proper seating.

G. Directional Pilot Valve (DPV) Leak Check

(1)Energize the DPV solenoid.

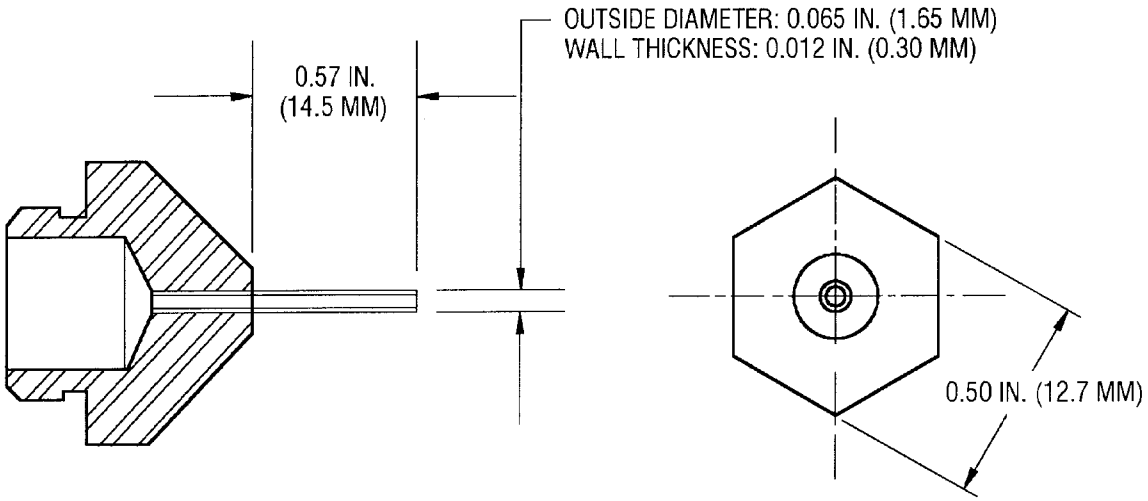
(a)Connect the electrical ground power unit and energize the aircraft network (Ref. 24-41-00, P. Block 301).



BM5 78 31 06 2 LKM0 00

Directional Pilot Valve (DPV)
with Pressure Switch Removed - Pre MRAS SB 78-1137
Figure 203

R



TOLERANCE: +/-0.015 IN. (0.38 MM) (FOR 2 DECIMAL PLACES)
TOLERANCE: +/-0.005 IN. (0.13 MM) (FOR 3 DECIMAL PLACES)
TUBE MATERIAL: 304 CRES
BODY MATERIAL: 300 SERIES CRES

BM5 78 31 06 2 LLM0 00

MR10111-00-A

Locally Made Nozzle
Figure 204

(b)Make sure that Circuit Breaker 1KM for Engine Position 1 and/or Circuit Breaker 2KM for Engine Position 2 are in the closed position. Make sure that the aircraft is in the GROUND mode, with Circuit Breaker 1GB closed.

(c)Move the thrust reverser control lever to the REV IDLE position, listen for a "click" sound from the DPV, and hold the lever in position for 5 seconds. If you do not hear a "click", make sure that the applicable circuit breakers are closed.

(d)Move the thrust reverser control lever to forward idle position. Listen for a "click" sound from the DPV. If you do not hear a "click", do steps G.(1)(a) through G.(1)(d) again. If you do not hear a click the second time, assume that the DPV is closed, and go to step G.(1)(e).

(e)Open Circuit Breaker 1KM for Engine Position 1 and/or Circuit Breaker 2KM for Engine Position 2.

(f)De-energize that aircraft electrical network and disconnect the ground power unit (Ref. 24-41-00, P. Block 301).

CAUTION : DO NOT REMOVE THE DPV INLET FITTING BETWEEN THE ELBOW AND THE DPV HOUSING. THE FITTING HAS A FILTER/SCREEN THAT IS NECESSARY FOR SUPPLY AIR FILTRATION.

(2)Disconnect one pneumatic tube from the elbow at the DPV inlet.

R (Ref. Fig. 205) for Pre MRAS SB 78-1137

R (Ref. Fig. 206) for Post MRAS SB 78-1137

Install a locally obtained protective cap on the opening of the pneumatic tube.

(3)Disconnect two pneumatic tubes from the tee at the DPV outlet.

R (Ref. Fig. 205) for Pre MRAS SB 78-1137

R (Ref. Fig. 206) for Post MRAS SB 78-1137

Install a locally obtained protective cap on the opening of each pneumatic tube.

R Post MRAS SB 78-1137

(4)Loosen, but do not remove, the elbow (-5 AN nipple) at the inlet.

(a)Turn the elbow 45 degrees away from the torque box.

(b)TORQUE the coupling nut to between 155 and 175 lbf.in. (1.75 and 1.98 m.daN).

R End Post MRAS SB 78-1137

(5)Purge the flexible hose used with the test equipment setup at the DPV inlet for approximately 15 seconds.

WARNING : THE 0-15 PSIG (0-103.5 KPA) OR 0-30 PSIG (0-207 KPA) PRESSURE GAGE MUST BE ABLE TO WITHSTAND THE INLET PRESSURE OF 100 PSIG (690 KPA) IF THE DPV FAILS.

CAUTION : IF THE TEE FITTING AT THE DPV OUTLET IS ROTATED WHEN YOU CONNECT THE PRESSURE GAGE AND THE CAP ASSEMBLY, THEN YOU MUST REPLACE THE O-RING BETWEEN THE TEE AND THE DPV HOUSING.

(6)Set up the test equipment.

R (Ref. Fig. 207, 208, 210) for Pre MRAS SB 78-1137

R (Ref. Fig. 207, 209, 211) for Post MRAS SB 78-1137

(a)Drill a hole through the cap assembly to simulate the CDU orifice.

1 Insert a fitting in the cap assembly or hold the ferrule in a vice so that the ferrule does not turn when you drill the hole.

2 Use a No. 70 drill to drill a 0.027-0.029 in. (0.69-0.74 mm) diameter hole in the cap assembly (Ref. Fig. 207).

3 Mark the cap with red paint or a red marker to show that it has been changed.

4 Make sure that the diameter of the hole in the cap assembly is 0.027-0.029 in. (0.69-0.74 mm). Make sure that paint or unwanted material does not cause a blockage of the hole. To make sure the hole has the correct diameter, make sure that a 0.030 in. (0.76 mm) diameter pin cannot pass through the hole.

(7)Attach test equipment to the DPV.

R (Ref. Fig. 208, 210) for Pre MRAS SB 78-1137

R (Ref. Fig. 209, 211) for Post MRAS SB 78-1137

(8)Slowly increase the pressure at the DPV inlet from 0 to 100 psig (0-690 kPa) while you monitor the outlet pressure gage.

(a)If the outlet pressure is more than 3.0 psig (20.7 kPa) while the inlet pressure is slowly increased, stop increasing the inlet pressure and decrease the inlet pressure to 0 psig (0 kPa). Replace the DPV or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).

1 If you replace the DPV, do an operational check of the thrust reverser after the installation is completed (Ref. 78-31-00, P. Block 501).

(9)When the DPV inlet pressure is 100 psig (690 kPA), do a check for leaks.

(a)Apply Material No.C05-005 or equivalent to all test equipment connections (Ref. ASTM Test Standard E515, or equivalent).

(b)Tighten the connections as necessary to stop leaks.

(10)When there are no leaks in the test equipment, hold the DPV inlet pressure at 100 psig (690 kPa) for 60 seconds, then read the DPV outlet pressure gage.

(a)If the outlet pressure is more than 3.0 psig (20.7 kPa) replace the DPV or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).

1 If you replace the DPV, do an operational check of the thrust reverser after the installation is completed (Ref. 78-31-00, P. Block 501).

(11)Decrease the pressure at the DPV inlet to 0 psig (0 kPa).

(12)Disconnect the test equipment from the DPV.

R (Ref. Fig. 208, 210) for Pre MRAS SB 78-1137

R (Ref. Fig. 209, 211) for Post MRAS SB 78-1137

R Post MRAS SB 78-1137

(13)Loosen, but do not remove, the elbow (-5 AN nipple) at the inlet.

(a)Turn the elbow 45 degrees toward the torque box.

(b)TORQUE the coupling nut to between 155 and 175 lbf.in. (1.75 and 1.98 m.daN).

R End Post MRAS SB 78-1137

(14)Remove the protective caps from the openings of the pneumatic tubes that connect to the tee at the DPV outlet. Connect the two pneumatic tubes to the tee at the DPV outlet. TORQUE the coupling nuts to between 135 and 150 lbf.in. (1.53 and 1.70 m.daN). Lockwire the coupling nuts.

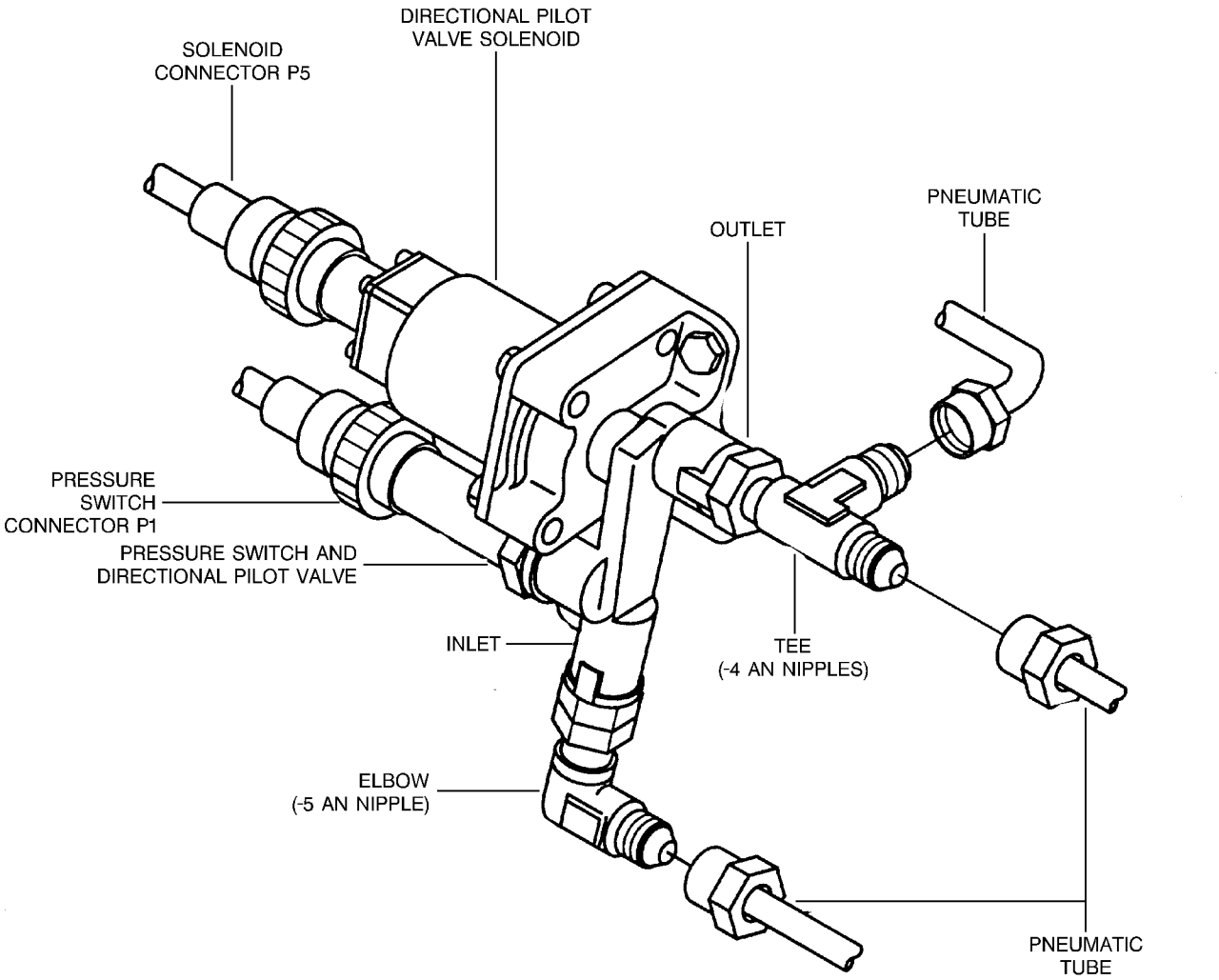
R (Ref. Fig. 205) for Pre MRAS SB 78-1137

R (Ref. Fig. 206) for Post MRAS SB 78-1137

(15)Remove the protective cap from the opening of the pneumatic tube that connects to the elbow at the DPV inlet. Connect the pneumatic tube to the elbow at the DPV inlet. TORQUE the coupling nut to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN). Lockwire the coupling nut.

R (Ref. Fig. 205) for Pre MRAS SB 78-1137
R (Ref. Fig. 206) for Post MRAS SB 78-1137

H. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(3)Do an operational check of the thrust reverser system (Ref. 78-31-00, P. Block 501).



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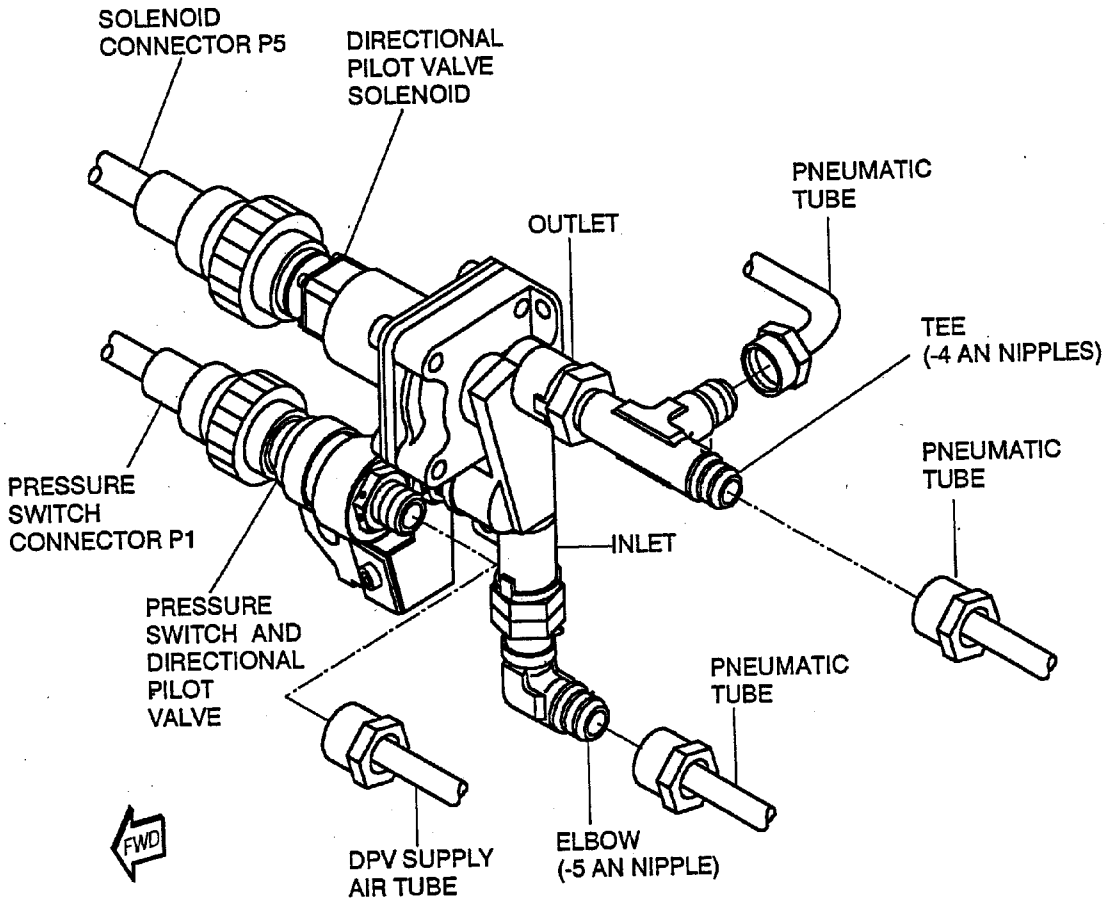
Directional Pilot Valve Leak Check -
Pre MRAS SB 78-1137
Figure 205

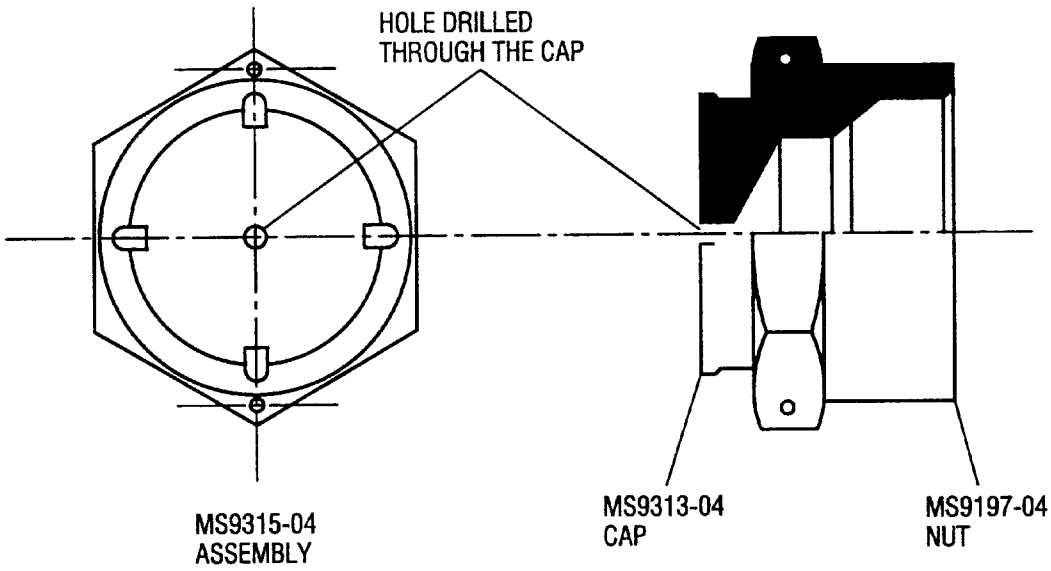
R



BM5 78 31 06 2 LCN0 00

Directional Pilot Valve Leak Check -
Post MRAS SB 78-1137
Figure 206

R



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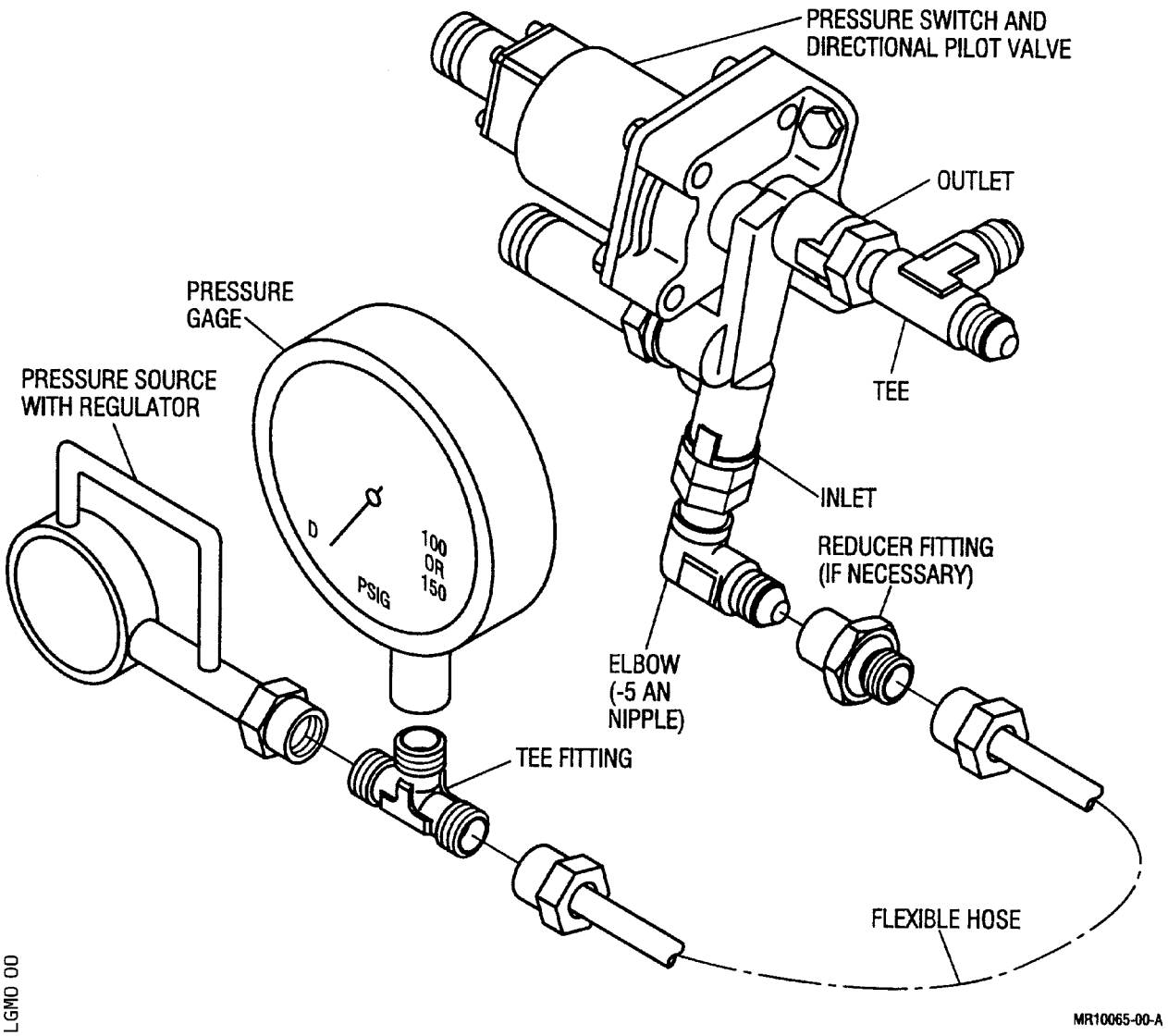
Cap Assembly
Figure 207



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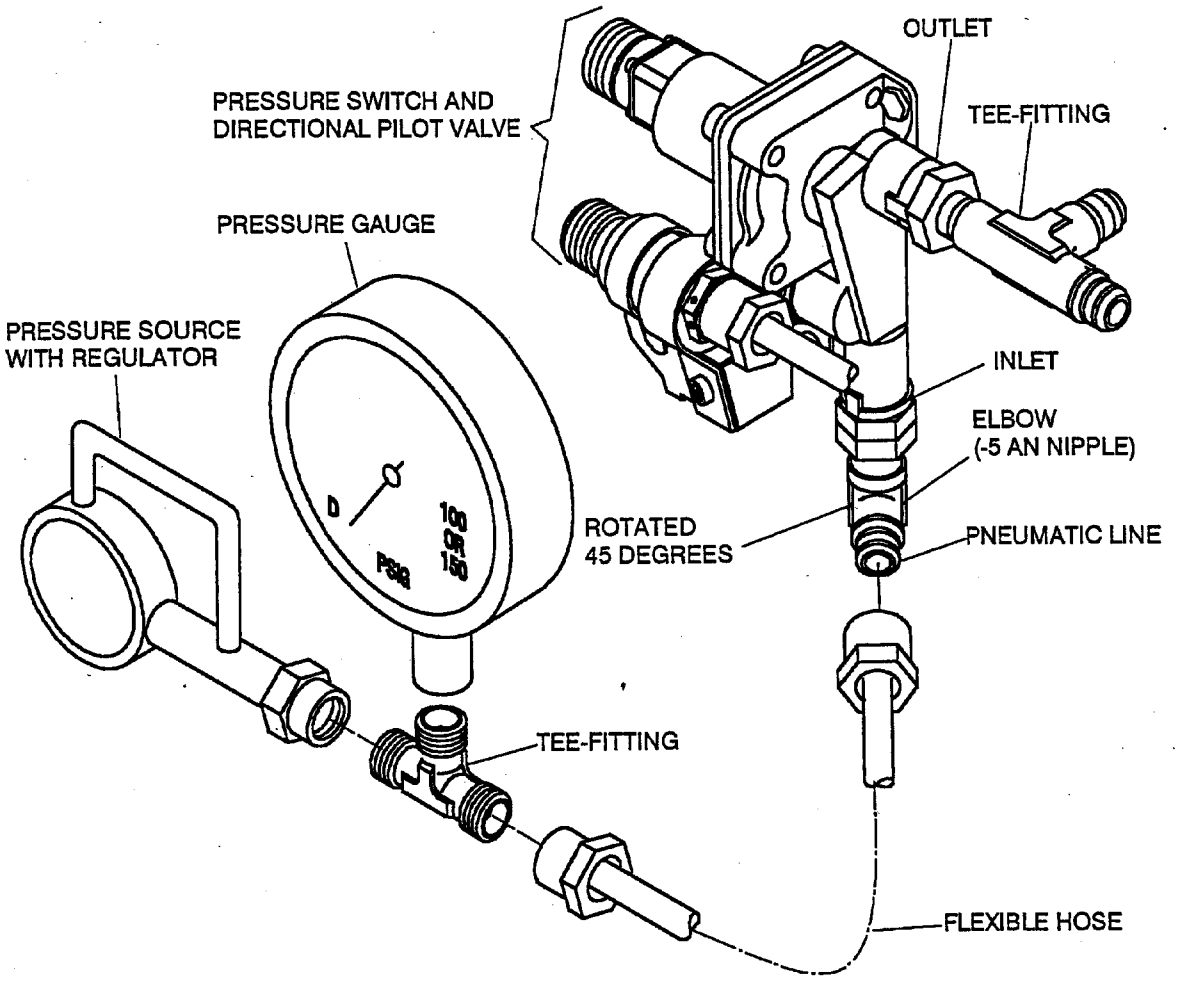
Directional Pilot Valve Leak Check - Test Setup
for DPV Inlet (Pre MRAS SB 78-1137)
Figure 208

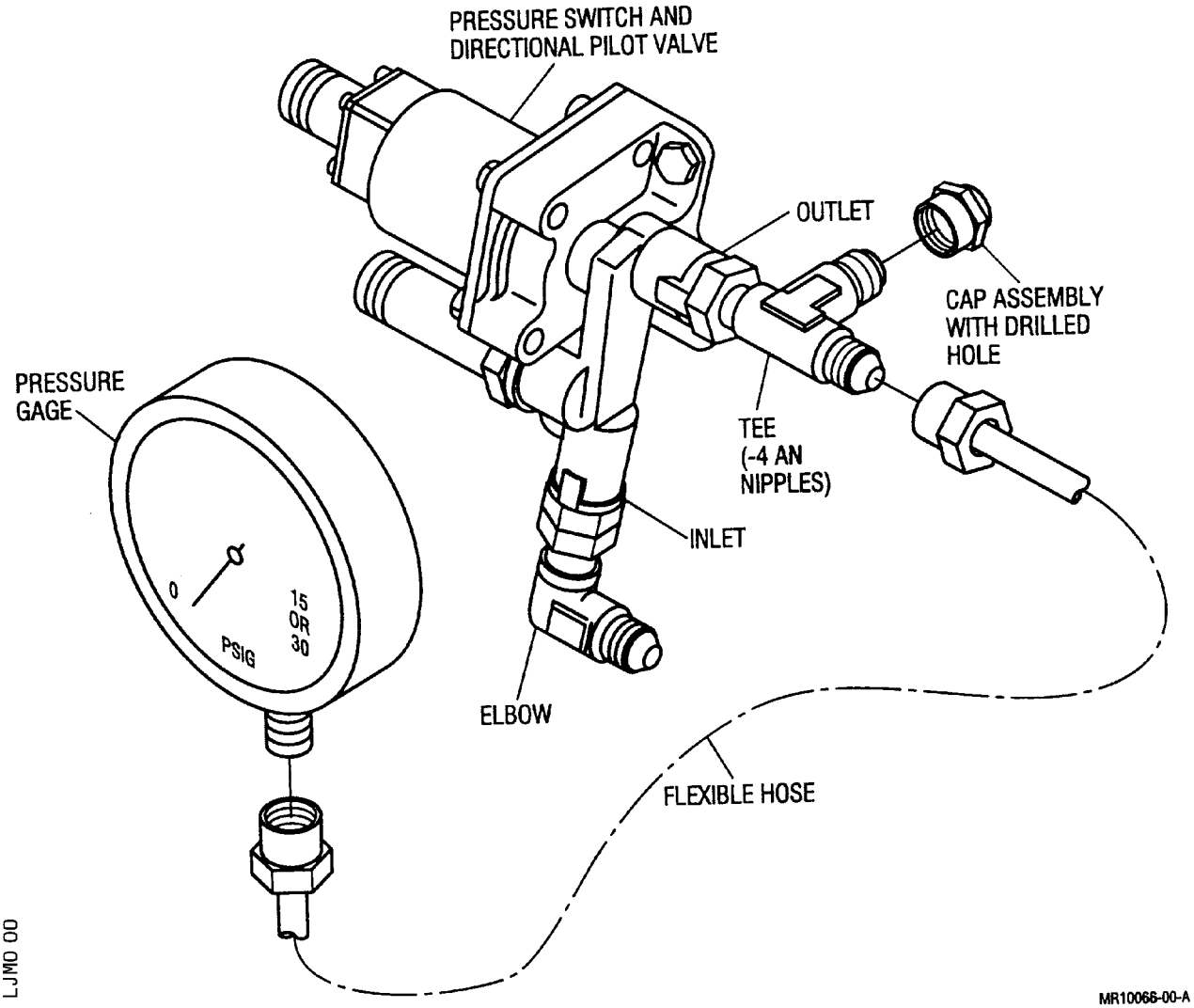
R



BM5 78 31 06 2 LGNO 00

Directional Pilot Valve Leak Check - Test Setup
for DPV Inlet (Post MRAS SB 78-1137)
Figure 209

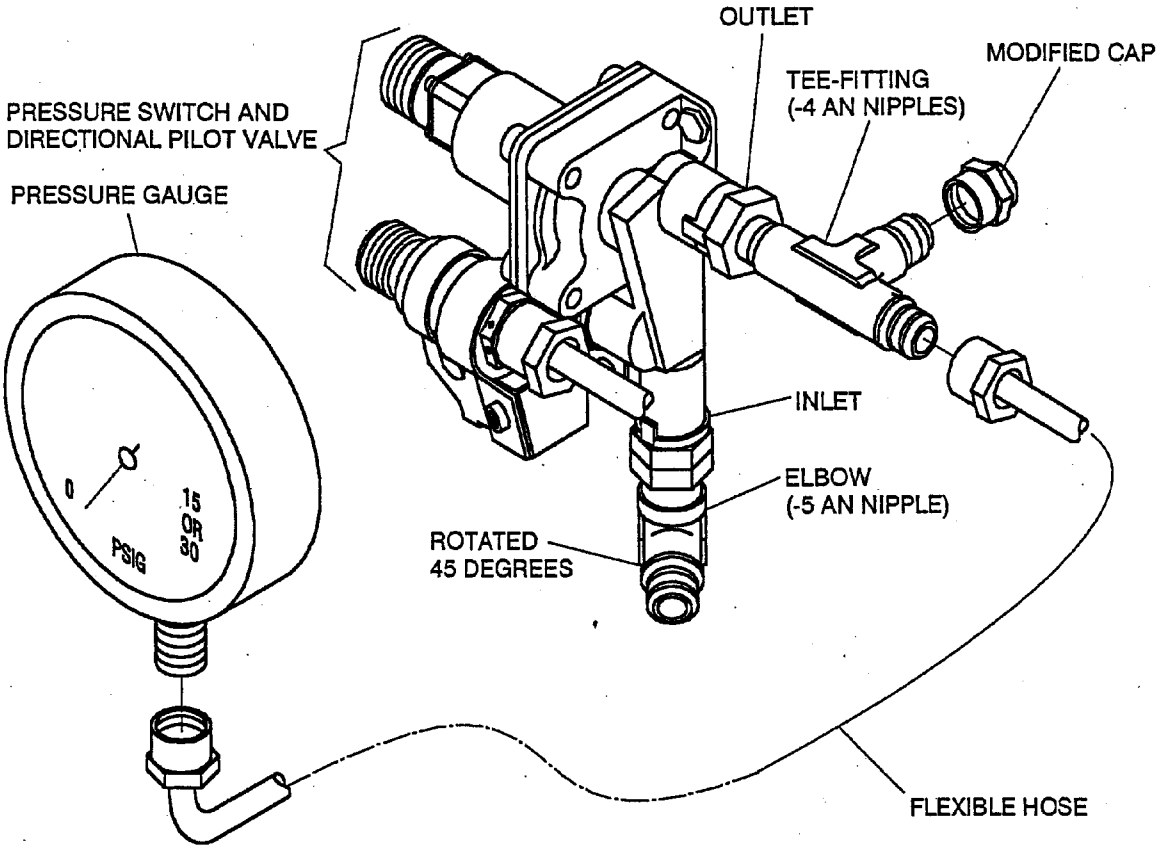
R



BM5 78 31 06 2 LJMO 00

Directional Pilot Valve Leak Check - Test Setup
for DPV Outlet (Pre MRAS SB 78-1137)
Figure 210

R



BM5 78 31 06 2 LJN0 00

Directional Pilot Valve Leak Check - Test Setup
for DPV Outlet (Post MRAS SB 78-1137)
Figure 211

R

DIRECTIONAL PILOT VALVE FILTER - MAINTENANCE PRACTICES

1. General

A. This procedure has three tasks :
(1)The first one is to remove the directional pilot valve filter.
(2)The second one is to clean the directional pilot valve filter.
(3)The third one is to install the directional pilot valve filter.

B. The directional pilot valve filter is installed on the inlet port of the directional pilot valve.
The directional pilot valve is located on the thrust reverser torque box at the 10 o'clock position.

2. Equipment and Materials

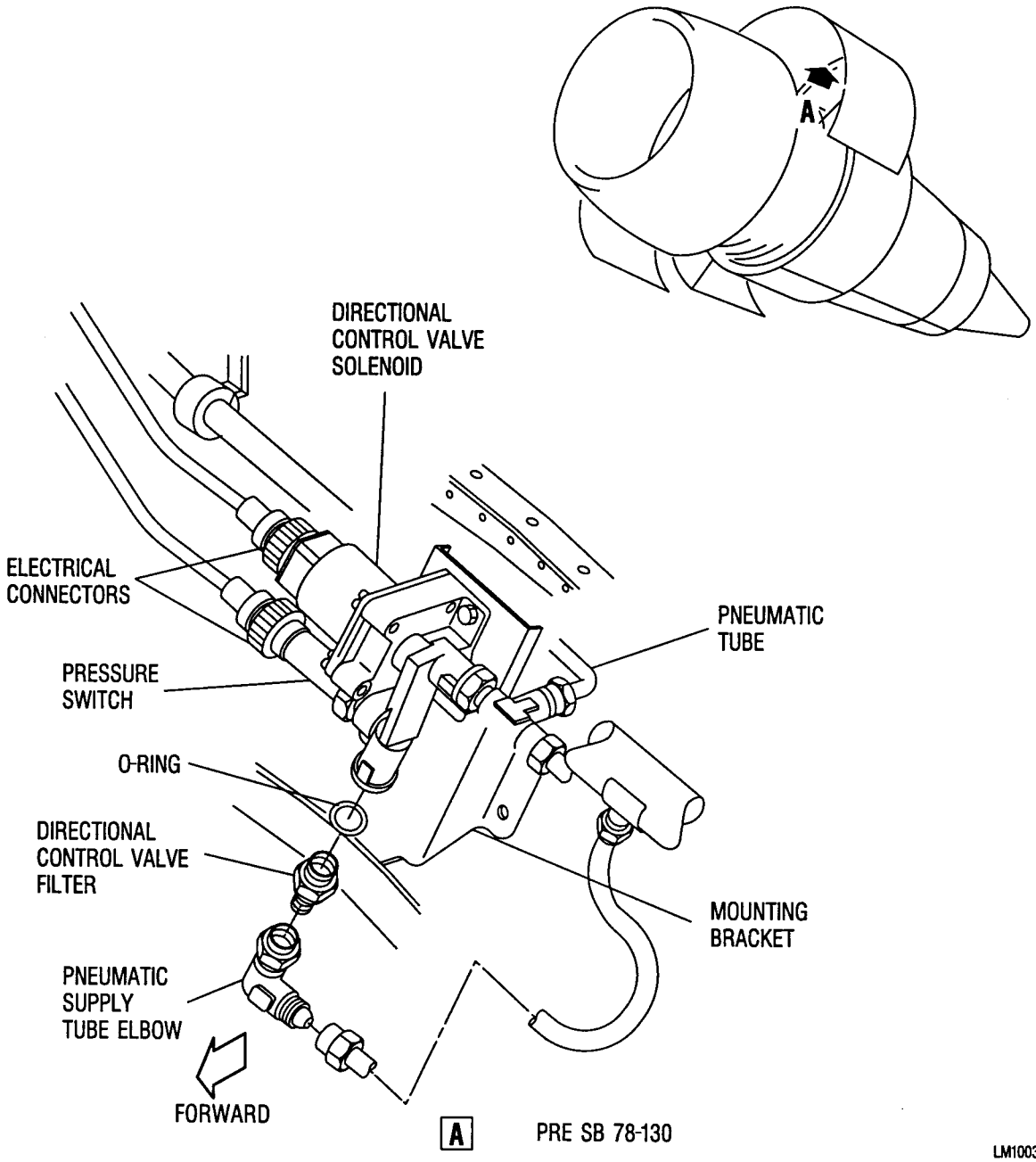
ITEM	DESIGNATION
A.	Stiff Fiber-Bristled Brush
B.	Dip Tank
C.	Torque Wrench, 155-175 lbf.in. (1.75-1.98 m.daN)
D. Material No.C02-058	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
E. Material No.C04-002	Cleaning Compounds and Solvents (Ref. 70-00-00)
F. Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

3. Procedure

A. Job Set-Up
(1)Make sure the applicable reverse thrust lever is in forward thrust position, and install a DO-NOT-OPERATE tag.
(2)Open, safety and tag the applicable circuit breakers and open the left fan cowl door (Ref. 71-13-00, P. Block 301).

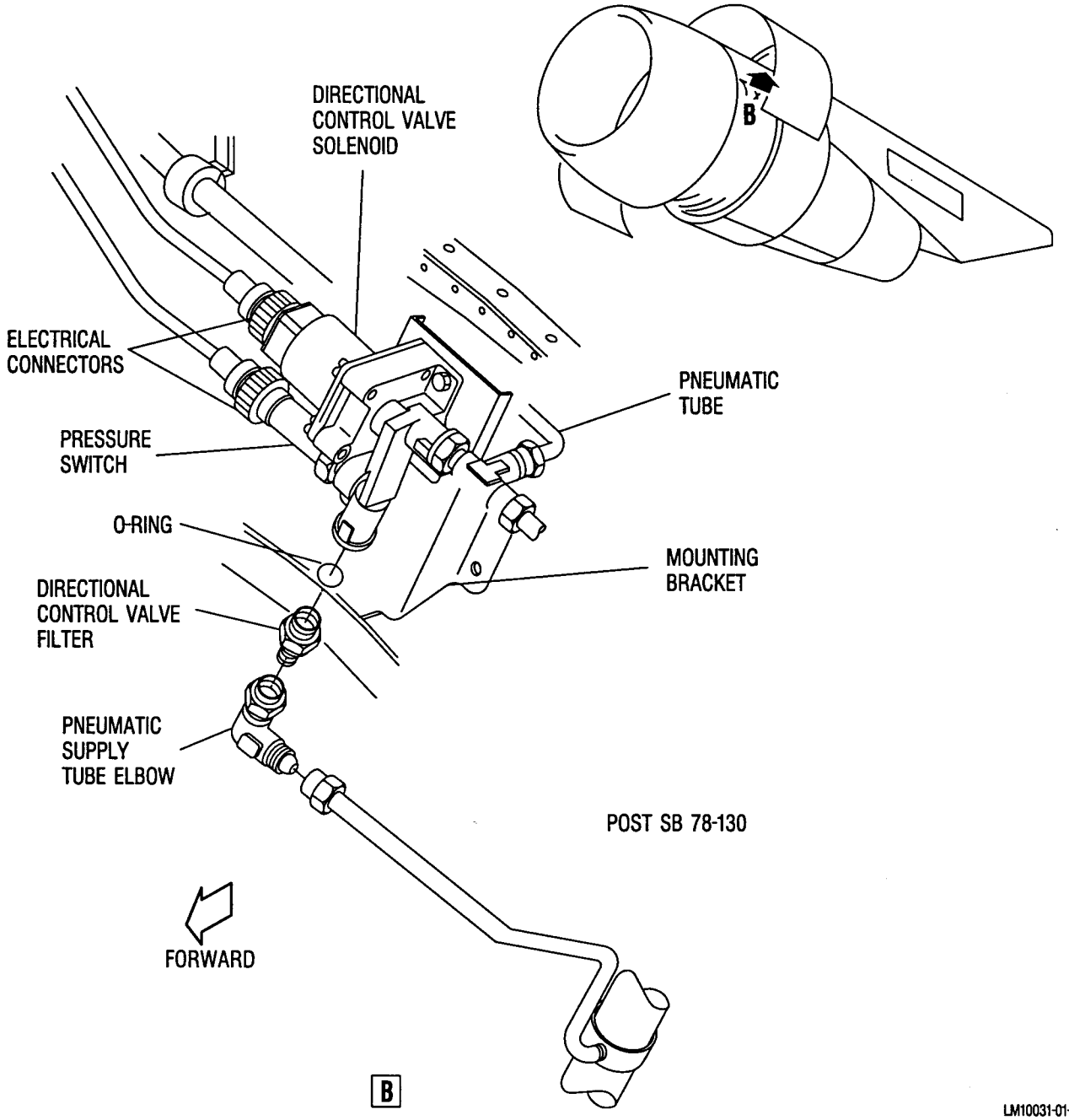
B. Remove the directional pilot valve filter (Ref. Fig. 201)
(1)Cut and remove the lockwire, then disconnect the pneumatic supply tube elbow on the inlet port of the directional pilot valve.
(2)Cut and remove the lockwire, then remove the directional pilot valve filter.
(3)Remove the O-ring from the filter and discard it.

C. Clean the directional pilot valve filter.
WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES, AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIR FLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY



BM5 78 31 09 2 LAMA 00

Directional Pilot Valve Filter Installation (Sheet 1/2)
Figure 201



BM5 78 31 09 2 LAMJ 00

Directional Pilot Valve Filter Installation (Sheet 2/2)
Figure 201

WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC, AND HIGHLY FLAMMABLE.

(1)Put the filter in a dip tank of Material No.C04-002. Soak and shake the filter in the solvent until you remove the oil and grease.

(2)Use a stiff fiber-bristled brush to remove the hardened grease or soft carbon deposits.

WARNING : IF YOU CLEAN WITH COMPRESSED AIR, IT CAN CREATE AIRBORNE PARTICLES THAT CAN GO INTO YOUR EYES OR GO THROUGH YOUR SKIN. DO NOT USE MORE THAN 30 PSIG (207 KPA) PRESSURE. WEAR GOGGLES. DO NOT POINT COMPRESSED AIR IN THE DIRECTION OF YOUR SKIN.

(3)Dry the filter with filtered compressed air.

D. Install the directional pilot valve filter.

(1)Install a new O-ring on the directional pilot valve filter.

(2)Apply a layer of Material No.C02-058 on the leading threads of the directional pilot valve filter.

(3)Install the directional pilot valve filter at the inlet port of the directional pilot valve.

(a)TORQUE the filter to between 155 and 175 lbf.in. (1.75 and 1.98 m.daN).

(b)Safety the filter with Material No.C10-071 to the directional pilot valve housing.

(4)Connect the pneumatic supply tube elbow to the directional pilot valve filter.

(a)TORQUE the fitting nut to between 155 and 175 lbf.in. (1.75 and 1.98 m.daN).

(b)Safety the fitting nut with Material No.C10-071.

E. CLose-Up

(1)Make sure that the working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close the left fan cowl door (Ref. 71-13-00, P. Block 301).

(3)Remove the safety clips and tags. Close the circuit breakers.

(4)Remove the DO-NOT-OPERATE tag from the reverse thrust lever.

(5)Do an operational test of the thrust reverser system (Ref. 78-31-00, P. Block 501).

THRUST REVERSER ACTUATION SYSTEM - MAINTENANCE PRACTICES

1. General

A. This procedure gives the instructions to add anti-freeze to the center drive unit (CDU) to reduce condensation that freezes.

B. This procedure applies to Pre GE SB 78-1103, GE SB 78-1104 and GE SB 78-1105 thrust reversers only. This procedure is recommended (but not required) for thrust reversers that are Post GE SB 78-1103, Pre GE SB 78-1104 and Pre GE SB-1105.

C. Do this task to reduce events of chronic or intermittent no-deploy or slow-deploy problems which result from condensation that freezes in the thrust reverser actuation system.

D. This problem usually occurs when the airplane is operated on routes between a warm, humid environment and a cold environment. Moisture collected in the thrust reverser actuation system can condense and freeze due to low undercowl temperatures during cruise.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access platform
B.	Ethylene glycol, ASTM D2693, or
C.	Industrial grade ethylene glycol, ASTM E1119
D.	All industrial grade ethylene glycol mixtures with corrosion inhibitors that are considered by the manufacturer to be equivalent to items B and C
E.	Propylene glycol de-icing/anti-icing fluid, aircraft, SAE Type I (AMS 1424D)
F. Material No.C04-035 (See NOTE)	Cleaning Compounds and Solvents (Ref. 70-00-00)
G. Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 23-44-00, P. Block 501	Cabin and Service Interphone
- 24-41-00, P. Block 301	AC External Power
- 36-00-00, P. Block 1	Pneumatic
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System

NOTE :

SUPPLIERS FOR ETHYLENE GLYCOL ASTM D2693	SUPPLIERS FOR PROPYLENE GLYCOL SAE TYPE I PER AMS 1424D
Ashland Chemical 5200 Blazer Parkway Dublin, OH 43017	Killfrost DF Plus (88) Cryotech Deicing Technology 6103 Orthoway

SUPPLIERS FOR ETHYLENE GLYCOL ASTM D2693	SUPPLIERS FOR PROPYLENE GLYCOL SAE TYPE I PER AMS 1424D
USA Telephone : 800.890.1056 Fax : 800.324.7519	Fort Madison, IA 52627 USA Telephone : 800.346.7237 or 319.372.6012 Fax : 319.372.2662 e-mail: deicers cryotech.com
General Transworld Corporation 22828 Lockness Ave. Torrance, CA 90501 USA Telephone : 310.326.9899 Fax : 310.326.9988	JARKLEER 1000 Jarchem Industries, Inc. 414 Wilson Avenue Newark, NJ 07105 USA Telephone : 973.344.0600 Fax : 973.344.5743
	Star Bright Antifreeze Kinpac, Inc. 2780 Gunter Park Dr., E. Montgomery, AL 36109 USA Telephone : 800.327.8583 Fax : 954.587.2813

3. Procedure

A. Job Set-Up

WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES.

(1)Open, safety and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

(2)Install the access platform.

(3)Connect the electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Connect the interphone system between the flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).

WARNING : MAKE SURE THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT. DAMAGE OR INJURY CAN OCCUR IN CASE OF UNCOMMANDED THRUST REVERSER OPERATION OR HIGH VELOCITY AIR THAT COMES FROM THE CDU AIR TUBES. MAKE SURE THAT PERSONNEL USE EYE AND EAR PROTECTION.

CAUTION : BEFORE YOU OPERATE THE THRUST REVERSER, MAKE SURE THAT THE TRANSLATING COWLS ARE FREE TO DEPLOY AND STOW.

(5)Connect an external pneumatic power source to the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).

Pre GE SB 78-1103, GE SB 78-1104 and GE SB 78-1105

B. Procedure-Add Anti-freeze to the Center Drive Unit (CDU)

(Ref. Fig. 201, 202)

NOTE : This procedure is recommended (but not required) for thrust reversers that are Post GE SB 78-1103, Pre GE SB 78-1104 and Pre GE SB-1105.

CAUTION : BE CAREFUL TO PREVENT CONTAMINATION OF THE PNEUMATIC SYSTEM WHILE THE SIGNAL AIR TUBE IS DISCONNECTED.

(1)On the left thrust reverser half, cut and disconnect the lockwire and disconnect the signal air tube at the CDU.

(2)Use a squeeze bottle or a syringe with a flexible tube to inject 0.33-0.53 oz (10-16 ml) of anti-freeze into the directional control valve (DCV) chamber of the left CDU through the open port. Make sure you fully fill the chamber.

NOTE : The tube must have an outer diameter of 0.125 in. (3.2 mm) or less.

(3)Connect the left signal air tube to the inlet port of the DCV chamber. TORQUE the coupling nut to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).

Pre GE SB 78-1103

(4)At the option of the operator do either step (a) or (b) below. It is not necessary to do both procedures.

(a)Temporarily replace the fluid passage bolt (P/N 9289M40P02) at the inlet connector for the right CDU with a different bolt (P/N AN775-4J).

1 Cut and remove the lockwire at the inlet connector for the right CDU.

CAUTION : MAKE SURE TO HOLD THE SIGNAL AIR TUBE CONNECTOR WHEN YOU REPLACE THE FLUID PASSAGE BOLT.
DAMAGE TO THE SIGNAL AIR LINE CAN OCCUR IF THE CONNECTOR TURNS WHEN YOU REPLACE THE BOLT.

2 Hold the signal air tube in position while you remove fluid passage bolt P/N 9289M40P02.

3 Hold the signal air tube in position while you install fluid passage bolt P/N AN775-4J at the inlet connector.

NOTE : This will prevent leakage of anti-freeze.

NOTE : Fluid passage bolt P/N AN775-4J does not have a drain hole or lockwire hole.

4 Apply a layer of locally obtained red paint to the head of fluid passage bolt P/N AN775-4J for easy identification.

(b)Temporarily block the drain hole in the head of the fluid passage bolt (P/N 9289M40P02) with adhesive tape and foil.

1 On the right hand CDU inlet connector, use isopropyl alcohol (Material No.C04-035) to clean the head of the fluid passage bolt P/N 9289M40P02.

CAUTION : MAKE SURE THE DRAIN HOLE IN THE HEAD OF THE FLUID PASSAGE BOLT IS NOT BLOCKED BY ADHESIVE FROM THE ADHESIVE TAPE.
USE FOIL TO MAKE SURE THE ADHESIVE TAPE DOES NOT COME IN CONTACT WITH THE DRAIN HOLE.

2 Use a piece of foil (or non-adhesive equivalent) to block the drain hole in the fluid passage bolt P/N 9289M40P02. Use adhesive tape (preferably red in color) to tape the foil over the drain hole.

End Pre GE SB 78-1103

Post GE SB 78-1103

(4)At the option of the operator do either step (a) or (b) below. It is not necessary to do both procedures.

(a)Temporarily replace the tube coupling nut (P/N J1312P04D) and tube cap (P/N 491B0700076-001) on the right hand CDU drip loop extension of the signal air tube.

1 Cut and remove the safety wire on the tube coupling nut P/N J1312P04D and tube cap P/N 491B0700076-001.

2 Remove the tube coupling nut P/N J1312P04D and tube cap P/N 491B0700076-001 and install the Cap Assembly P/N MS9314-04 or P/N J1315G104.

NOTE : Cap Assembly P/N MS9314-04 and Cap Assembly P/N J1315G104 do not have drain holes.

(b)Temporarily block the drain hole in the head of the tube cap (P/N 491B0700076-001) with adhesive tape and foil.

1 On the right hand CDU drip loop extension of the signal air tube, use isopropyl alcohol (Material No.C04-035) to clean the head of the tube cap P/N 491B0700076-001.

CAUTION : MAKE SURE THE DRAIN HOLE IN THE HEAD OF THE TUBE CAP IS NOT BLOCKED BY ADHESIVE FROM THE ADHESIVE TAPE. USE FOIL TO MAKE SURE THE ADHESIVE TAPE DOES NOT COME IN CONTACT WITH THE DRAIN HOLE.

2 Use a piece of foil (or non-adhesive equivalent) to block the drain hole in the tube cap P/N 491B0700076-001. Use adhesive tape (preferably red in color) to tape the foil over the drain hole.

End Post GE SB 78-1103

CAUTION : BE CAREFUL TO PREVENT CONTAMINATION OF THE PNEUMATIC SYSTEM WHILE THE SIGNAL AIR TUBE IS DISCONNECTED.

(5)On the right hand thrust reverser half, cut and remove the lockwire and disconnect the signal air tube at the 10 o'clock position (as you look aft).

Pre GE SB 78-1103

(6)Use a squeeze bottle or a syringe with a flexible tube to inject 0.33-0.53 oz (10-16 ml) of anti-freeze into the right-hand signal air tube so that the anti-freeze will flow down the tube into the CDU.

End Pre GE SB 78-1103

Post GE SB 78-1103

(6)Use a squeeze bottle or a syringe with a flexible tube to inject 0.40-0.61 oz (12-18 ml) of anti-freeze into the right-hand signal air tube so that the anti-freeze will flow down the tube into the CDU.

NOTE : Approximately 0.07 oz (2 ml) of anti-freeze is needed to fill the drip loop extension of the signal air tubes.

End Post GE SB 78-1103

(7)Connect the signal air tube at the 10 o'clock position. TORQUE the coupling nut to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).

WARNING : MAKE SURE THE AREA AROUND THE THRUST REVERSER IS CLEAR OF PERSONNEL AND EQUIPMENT. DAMAGE OR INJURY CAN OCCUR IN CASES OF UNCOMMANDED THRUST REVERSER OPERATION OR HIGH VELOCITY AIR THAT COMES FROM THE CDU AIR TUBES. MAKE SURE THAT PERSONNEL USE EYE AND EAR PROTECTION.

(8)Use the pneumatic system with the aircraft auxiliary power unit (APU) or ground power cart to apply approximately 30-60 psig (207-414 kPag)

of air pressure to the thrust reverser upstream of the PRSOV (Ref. 36-00-00, P. Block 1).

(9)Close the thrust reverser control circuit breaker.

(10)Move the reverse thrust lever to the deploy position.

(a)Look for mist at the drain hole of the CDU adjustment covers. It is correct to see mist when the translating cowl is deployed.

(11)Move the reverse thrust lever to the stow position.

(a)Look for mist at the drain hole of the CDU adjustment covers. It is not correct to see mist when the translating cowl is stowed.

(12)Do steps (10) and (11) again so that the translating cowl is deployed and stowed two times.

(13)Make sure there is a layer of anti-freeze on the inside of the DCV chamber of each CDU.

(a)Look at the CDU adjustment cover drain holes to see if there are signs of mist or moisture. If there is mist or moisture, go to paragraph 3.C.

(b)If you do not see mist or moisture, do steps (1) through (3) and (5) through (13) again as necessary.

C. Close-Up (Ref. Fig. 201, 202, 203)

(1)Open the thrust reverser control circuit breaker.

(2)On the left thrust reverser half, safety the signal air tube coupling at the CDU with lockwire (Material No.C10-071).

(3)On the right reverser half, safety the signal air tube coupling at the 10 o'clock position with lockwire (Material No.C10-071).

CAUTION : IF YOU DO NOT REPLACE FLUID PASSAGE BOLT P/N AN775-4J WITH FLUID PASSAGE BOLT P/N 9289M40P02, THE THRUST REVERSER WILL NOT OPERATE CORRECTLY.

Pre GE SB 78-1103

(4)If procedure step B.(4)(a) was performed, do step C.(4)(a) that follows. If procedure step B.(4)(b) was performed, do step C.(4)(b) below.

(a)Replace the fluid passage bolt (P/N AN775-4J) with fluid passage bolt (P/N 9289M40P02) at the inlet connector for the right-hand CDU :

CAUTION : MAKE SURE TO HOLD THE SIGNAL AIR TUBE CONNECTOR WHEN YOU REPLACE THE FLUID PASSAGE BOLT.
DAMAGE TO THE SIGNAL AIR LINE CAN OCCUR IF THE CONNECTOR TURNS WHEN YOU REPLACE THE BOLT.

CAUTION : IF FLUID PASSAGE BOLT P/N 9289M40P02 IS NOT INSTALLED, THE FAN REVERSER WILL NOT OPERATE PROPERLY.

1 Hold the signal air tube in position while you remove fluid passage bolt P/N AN775-4J.

2 Hold the signal air tube in position while you install fluid passage bolt P/N 9289M40P02 at the inlet connector.

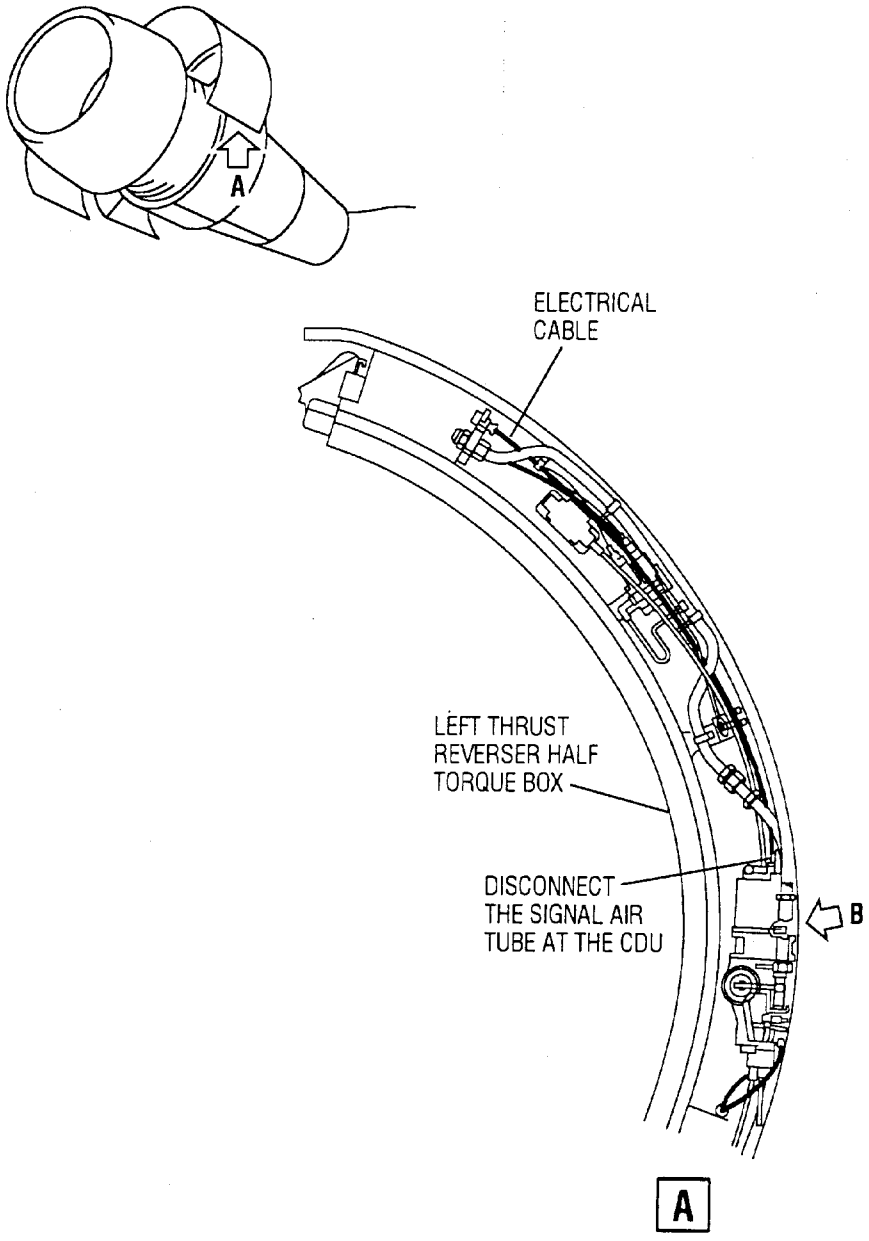
NOTE : Leakage of anti-freeze will occur when the fluid passage bolt is replaced. This leakage cannot be prevented but can be minimized by quick replacement of the fluid passage bolt.

3 TORQUE fluid passage bolt P/N 9289M40P02 to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).

4 Safety the fluid passage bolt with lockwire (Material No.C10-071).

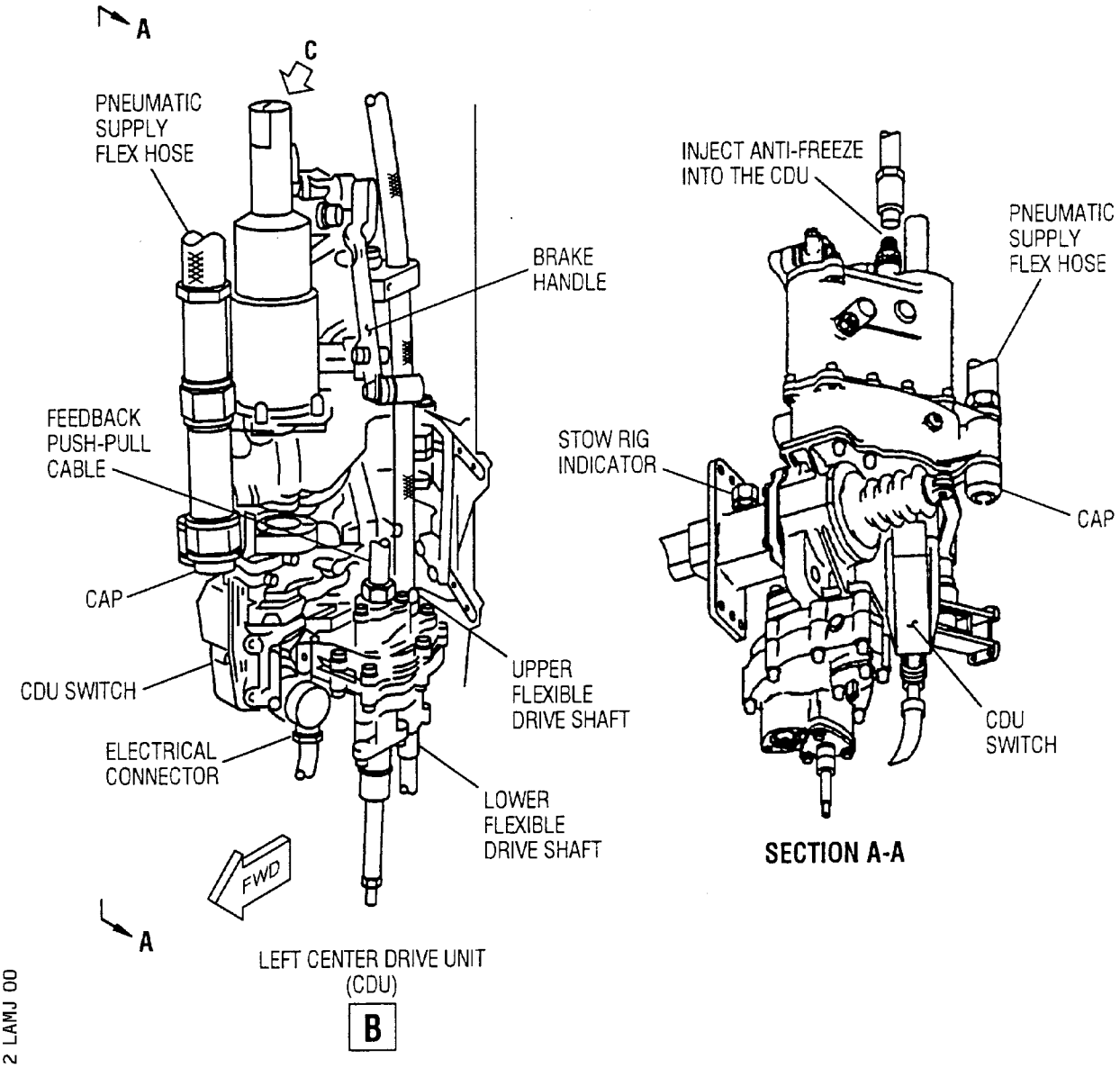
(b)Remove the tape and foil from the fluid passage bolt (P/N 9289M40P02) :

1 Remove and discard the tape and foil from the fluid passage bolt



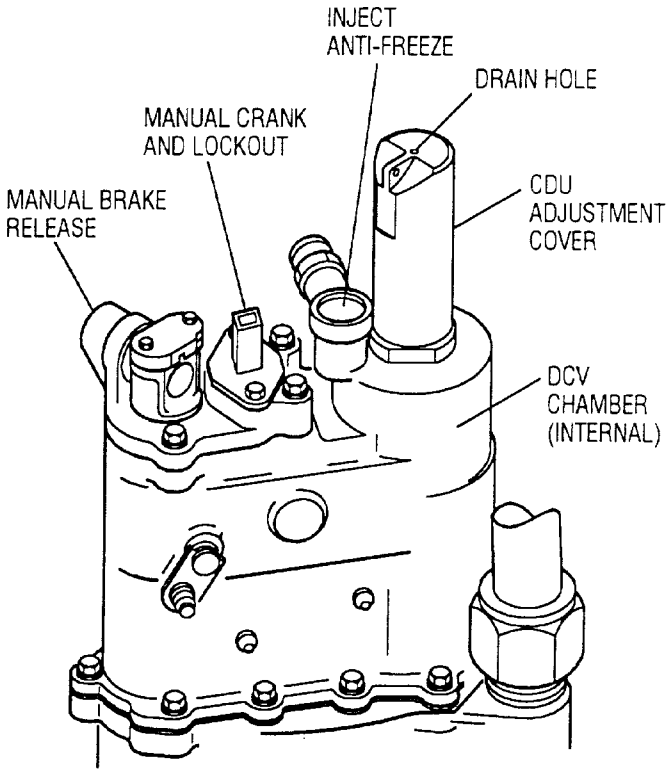
BM5 78 31 10 2 LAMA 00

Left Side Thrust Reverser Actuation System/Center Drive Unit (Sheet 1/3)
Figure 201



BM5 78 31 10 2 LAMJ 00

Left Side Thrust Reverser Actuation System/Center Drive Unit (Sheet 2/3)
Figure 201



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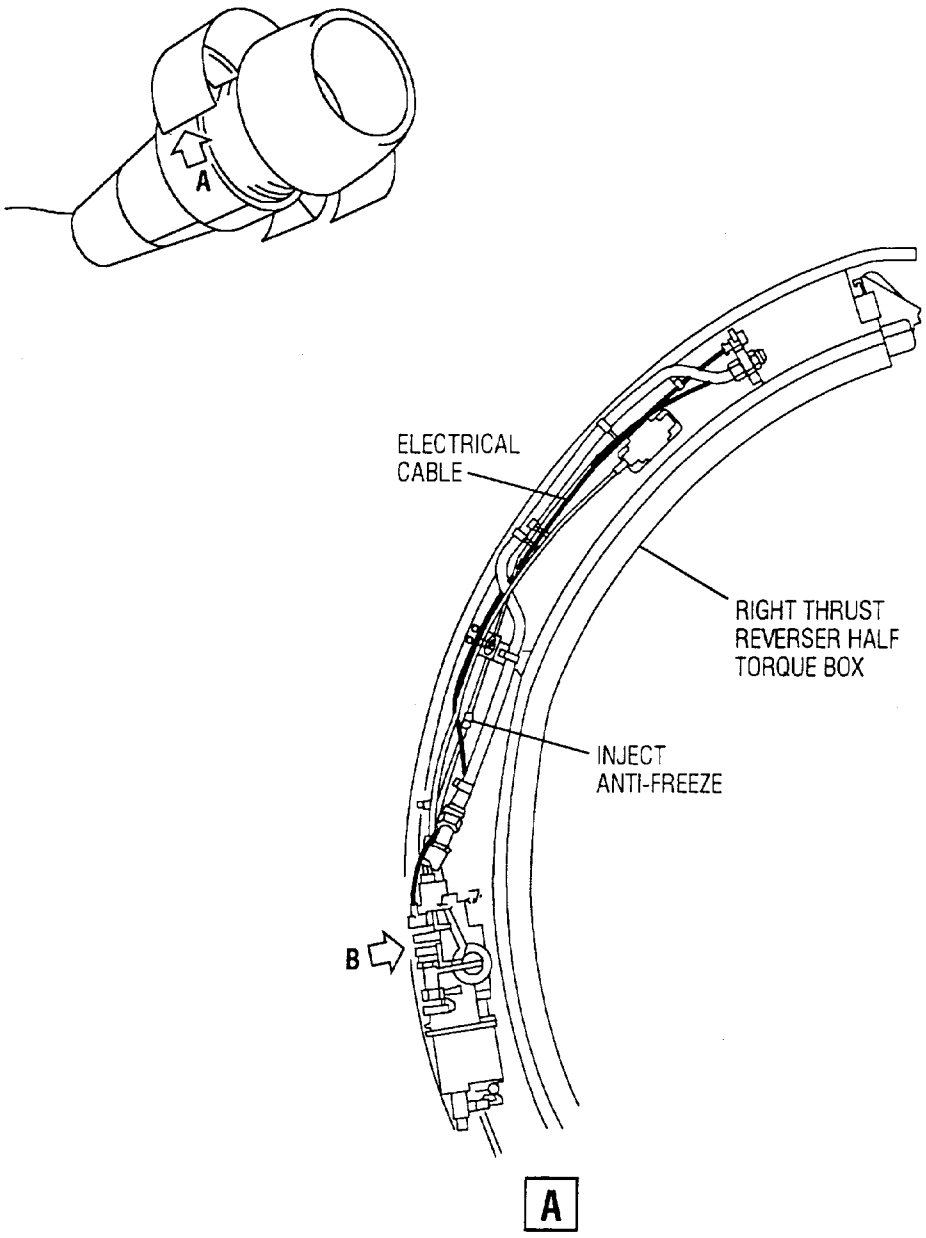
BM5 78 31 10 2 LAMS 00

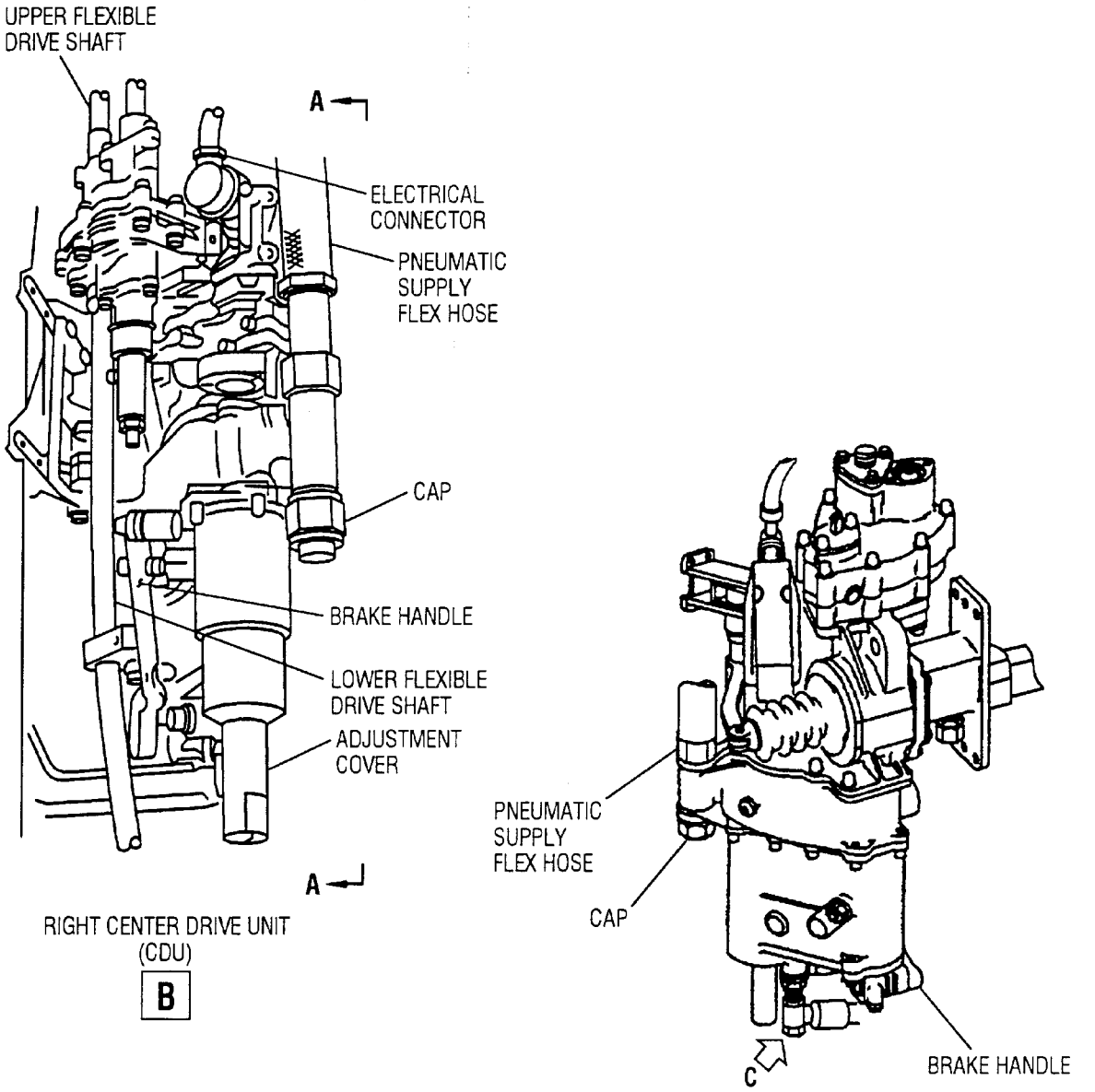
MR10079-00-A

Left Side Thrust Reverser Actuation System/Center
Drive Unit (Sheet 3/3)
Figure 201



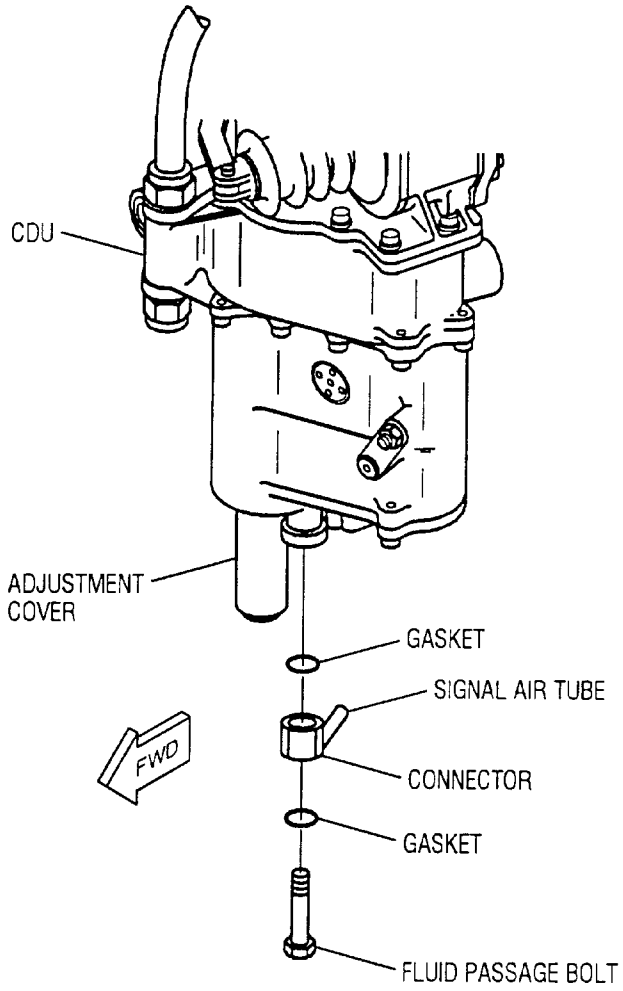
BM5 78 31 10 2 LCMA 00

Right Side Thrust Reverser Actuation System/Center Drive Unit (Pre GE SB 78-1103) (Sheet 1/3)
Figure 202



BM5 78 31 10 2 LCMJ 00

Right Side Thrust Reverser Actuation System/Center Drive Unit (Pre GE SB 78-1103) (Sheet 2/3)
Figure 202



MR10082-00-A

BM5 78 31 10 2 LCMS 00

Right Side Thrust Reverser Actuation System/Center Drive Unit (Pre GE SB 78-1103) (Sheet 3/3)
Figure 202

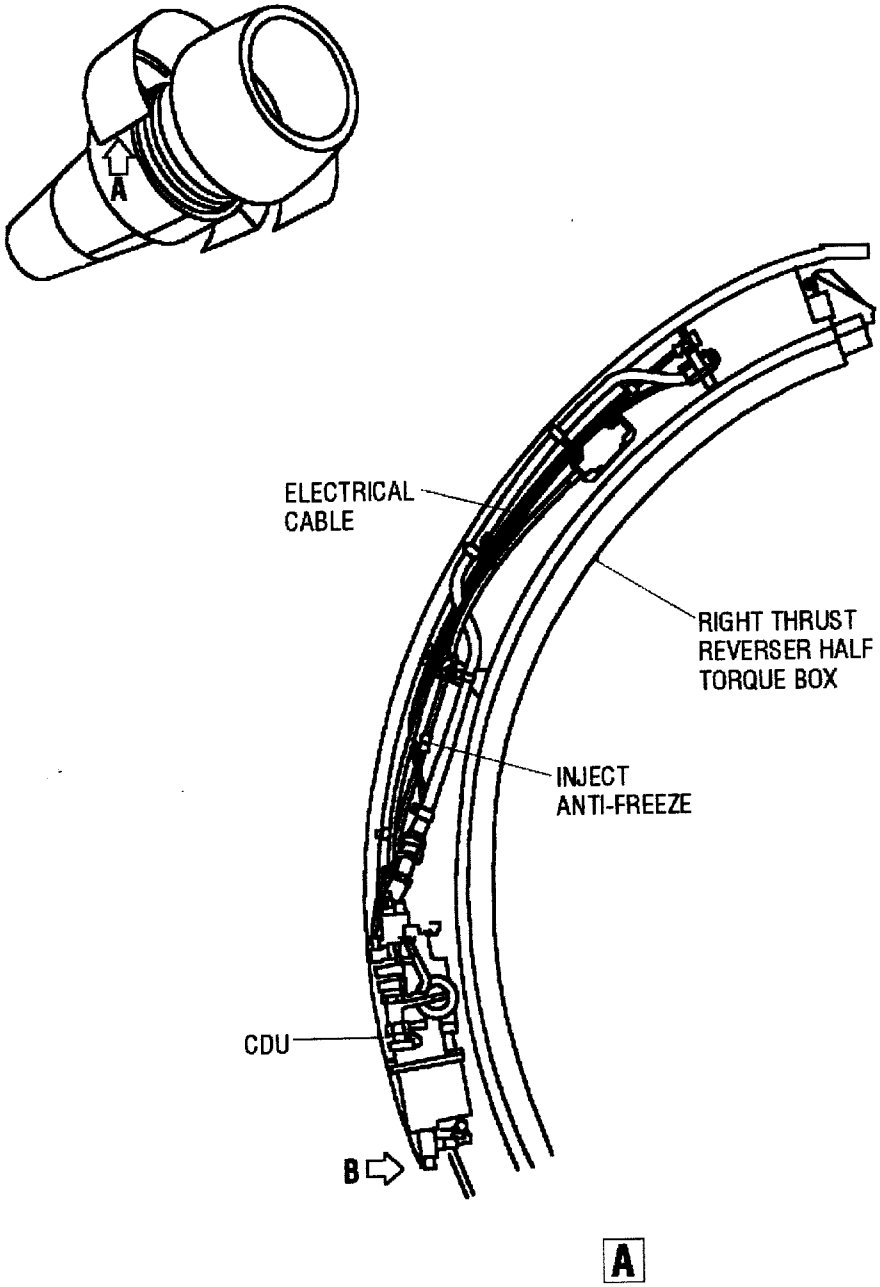
P/N 9289M40P02.
NOTE : Leakage of anti-freeze will occur when the tape and foil are removed from the fluid passage bolt. This leakage is normal.
2 Use isopropyl alcohol (Material No.C04-035) to remove all tape adhesive residue from the head of the fluid passage bolt P/N 9289M40P02.
3 Make sure that the drain hole in the fluid passage bolt P/N 9289M40P02 is not blocked.

End Pre GE SB 78-1103
Post GE SB 78-1103

(4)If procedure step B.(4)(a) was performed, do step C.(4)(a) that follows.
If procedure step B.(4)(b) was performed, do step C.(4)(b) below.
(a)Replace the cap assembly (P/N MS9314-04 or P/N J1315G104) with the tube coupling nut (P/N J1312P04D) and tube cap (P/N 491B0700076-001) :
1 Remove the cap assembly P/N MS9314-04 or P/N J1315G104 from the end of the signal air tube drip loop extension.
NOTE : Leakage of anti-freeze will occur when the cap assembly (P/N MS9314-04 or P/N J1315G104) is replaced by the tube coupling nut (P/N J1312P04D) and tube cap (P/N 491B0700076-001). This leakage is normal.
2 Install the tube cap P/N 491B0700076-001 on the end of the signal air tube drip loop extension with the tube coupling nut P/N J1312P04D.
NOTE : If tube coupling nut P/N J1312P04D and tube cap P/N 491B0700076-001 are not reinstalled, then the fan reverser will not operate properly.
3 TORQUE the tube coupling nut P/N J1312P04D to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).
4 Safety the tube coupling nut with lockwire (Material No.C10-071).
(b)Remove the tape and foil from the tube cap P/N 491B0700076-001 :
1 Remove the tape and foil over the drain hole in the tube cap P/N 491B070700076-001.
2 Use isopropyl alcohol (Material No.C04-035) to remove all tape adhesive residue from the head of the tube cap P/N 491B0700076-001.
3 Make sure that the drain hole in tube cap P/N 491B0700076-001 is not blocked.
NOTE : Leakage of anti-freeze will occur when the tape and foil are removed from the tube cap. This leakage is normal.

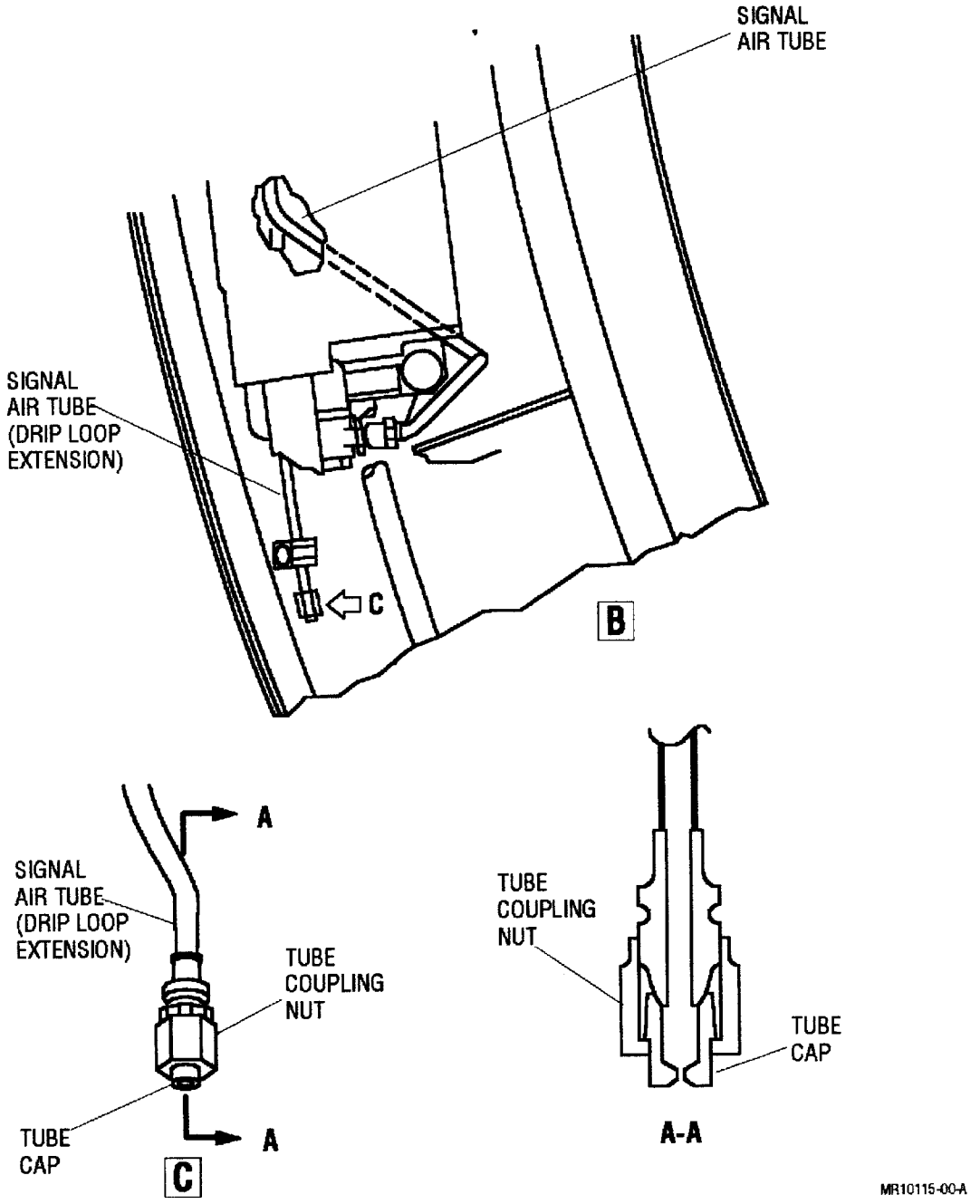
End Post GE SB 78-1103

(5)Remove the safety clips and tags, and close the applicable circuit breakers.
(6)Do an operational test of the thrust reverser (Ref. 78-31-00, P. Block 501).
(7)Disconnect the external pneumatic power source from the aircraft ground air connection or APU (Ref. 36-00-00, P. Block 1).
(8)Disconnect the interphone system between the flight compartment and the applicable engine area (Ref. 23-44-00, P. Block 501).
(9)De-energize the aircraft electrical network and disconnect the electrical ground power unit (Ref. 24-41-00, P. Block 301).
(10)Make sure the work area is clean and clear of tools and miscellaneous items of equipment.
(11)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).



BM5 78 31 10 2 LEMA 00

Right Side Thrust Reverser Actuation System/Center Drive Unit (Post GE SB 78-1103) (Sheet 1/2)
Figure 203



BM5 78 31 10 2 LEMJ 00

Right Side Thrust Reverser Actuation System/Center Drive Unit (Post GE SB 78-1103) (Sheet 2/2)
Figure 203

FAN REVERSER FLEXIBLE SHAFT ASSY - REMOVAL/INSTALLATION

1. General

A. The flexible drive shafts can be replaced independent of each other. The procedure below is typical and applies to any of the four flexible drive shafts.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench (33-37 lbf. in.) (0.37 - 0.42 m.daN)
C.	Corrosion Resistant Steel Lockwire
D.	Access Platform
E. Material No.C02-032	Anti-seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 12-22-78, P. Block 1	Thrust Reverser
- 78-31-00, P. Block 501	Fan Reverser Flexible Shaft Assy

3. Procedure

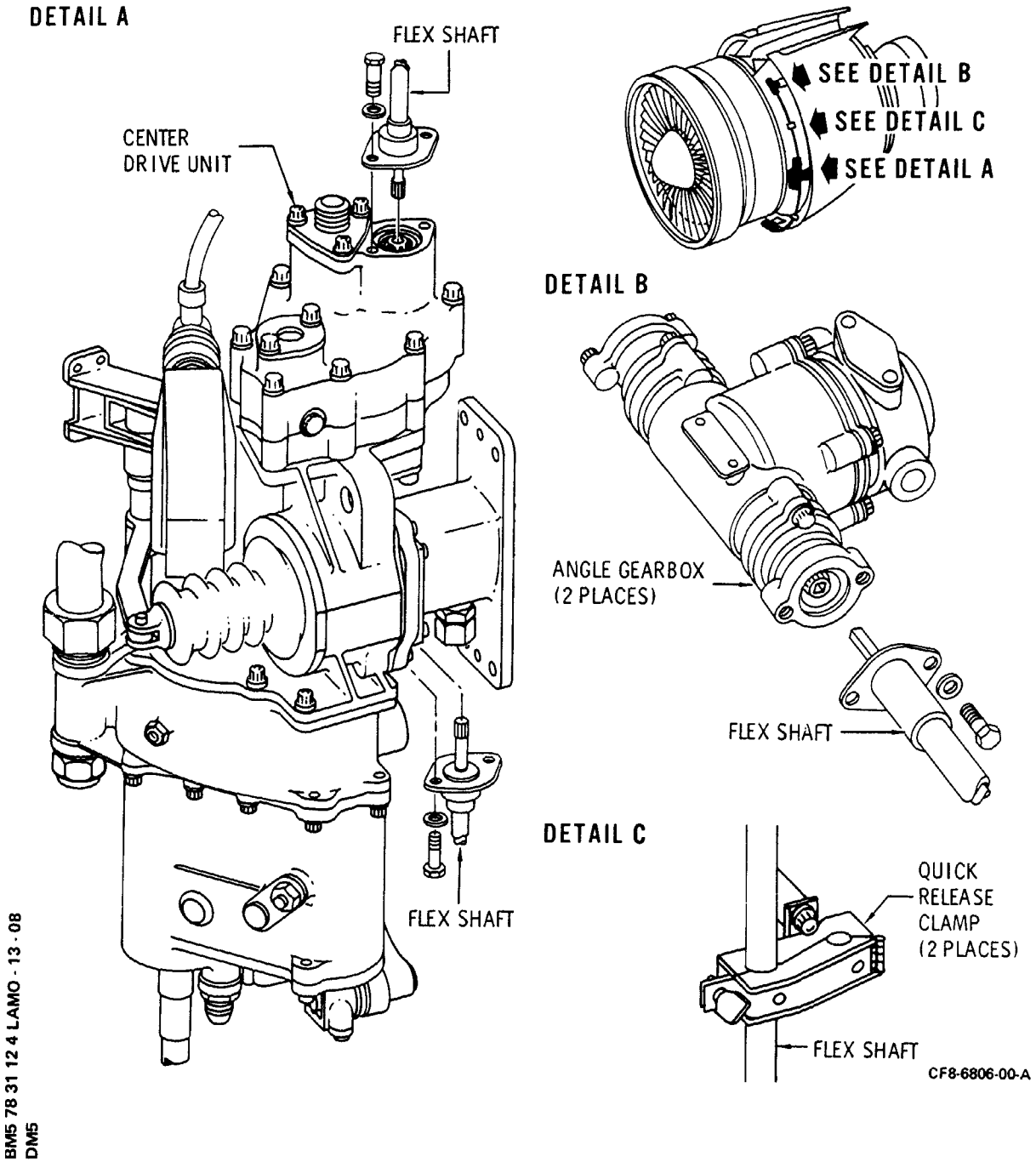
A. Job Set-Up
(1)Open, safety and tag the appropriate circuits breakers and open fan and thrust reverser and core cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform

B. Removal (Ref. Fig. 401)
CAUTION : IF ONE FLEXIBLE DRIVE SHAFT ON A REVERSER HALF FAILS, BOTH DRIVE SHAFTS ON THAT REVERSER HALF MUST BE REPLACED SINCE TORSIONAL LIMITS MAY HAVE BEEN EXCEEDED.
(1)Release center drive unit brake by pulling handle out, away from the CDU, approximately 60° (until a flat is felt).
(2)Remove two bolts securing lockout plate (on CDU) and remove plate.
(3)Open clamps that secure flexible shaft.
R (4)Remove bolts attaching flexible shaft to the center drive unit.
(5)Remove bolts that attach flexible shaft to the upper and/or lower angle gearbox.
(6)Remove flexible shaft assembly.

C. Installation (Ref. Fig. 401)
NOTE : If required, service flexible drive shaft prior to installation (Ref. 12-22-78, P. Block 1).
(1)Insert the square drive end of replacement flexible drive shaft into the upper and/or lower angle gearbox (as applicable) and attach with the bolts. Apply Material No.C02-032 to the bolt threads before you install the bolts. TORQUE the bolts to between 33 and 37 lbf. in.

R (0.37 and 0.42 m.daN).
(2)Connect quick release clamps.
(3)Rig reverser actuation system (Ref. 78-31-00, P. Block 501).

D. Close-Up
(1)Remove access platform.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove safety clips and tags and close circuit breakers. Close core cowl, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).



Reverser Flexible Shaft
Figure 401

FAN REVERSER FLEXIBLE SHAFTS - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-12, P. Block 401	Fan Reverser Flexible Shafts

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove flexible shafts (Ref. 78-31-12, P. Block 401).

B. Visual Inspection/Check
NOTE : (Ref. Fig. 601). Applies to step (4) (a).

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Mounting flanges for nicks, dents, or scratches	Any amount that can be blend repaired	Replace shaft (Ref. 78-31-12, P. Block 401).
(2)Binding	None allowed	Replace shaft (Ref. 78-31-12, P. Block 401).
(3)Casing for :		
(a)Twisting	Maximum of 30 degrees allowed	Replace shaft (Ref. 78-31-12, P. Block 401).
(b)Broken wires in braid	Three wires per lay per foot (305 mm) of casing length or 2 complete lays in each direction may be broken. (A lay is composed of 4 or 5 individual wire strands)	Trim broken wires if within limits or replace shaft
(c)End collars for looseness	None allowed	Replace shaft (Ref. 78-31-12, P. Block 401).

CAUTION : IF REMOVED, MAKE CERTAIN THAT SHAFT CORE IS PROPERLY LUBRICATED BEFORE INSTALLATION IN CASING.

(4)Core for :

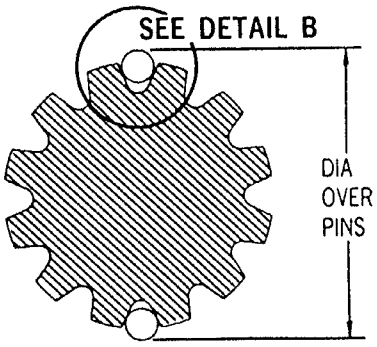
INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(a)Shaft (square end)	Corners must not show evidence of rounding. Minimum dimension cannot be less than 0.235 in. (5.96 mm)	Replace core (Ref. 78-31-12, P. Block 401).
(b)Spline wear	For splined end wear, diameter must be 0.452 in. (11.48 mm) minimum over 0.060 inch (1.52 mm) diameter pins	Replace core (Ref. 78-31-12, P. Block 401).
(b)Ends for residue buildup	None allowed	Wipe clean with clean dry cloth
(c)Ends for nicks or scratches	Any amount up to 0.030 inch (0.76 mm) deep provided part will assemble without binding , after removal of high metal	Replace shaft (Ref. 78-31-12, P. Block 401).
(d)Other areas for wear	For smooth wear transition, local wear shall not exceed 50 percent of individual wire thickness	Replace shaft (Ref. 78-31-12, P. Block 401).
(e)Broken wires	None allowed	Replace shaft (Ref. 78-31-12, P. Block 401).
(f)Local bowing, wire separation or humps	None allowed	Replace core (Ref. 78-31-12, P. Block 401).
(5)Installed Shaft for :		
(a)Clamping and bend radii	Clamp centerline must be aligned with shaft centerline. Bend radii must exceed 10 inches (254 mm)	Reclamp as required
(b)Bowing between clamps (indicates torque buildup)	None allowed	Replace shaft (Ref. 78-31-12, P. Block 401).

C. Close-Up
(1)Remove access platform.
(2)Make certain that working area is clean and clear of tools and

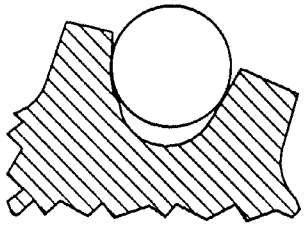
miscellaneous items of equipment.

(3)Remove safety clips and tags and close circuit breakers. Close core cowl, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

DETAIL B

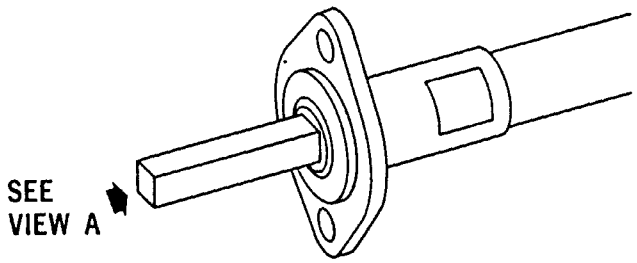


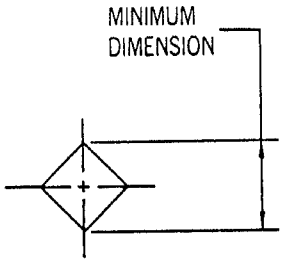
EVEN NUMBER OF TEETH
MEASUREMENT OF SPLINE WEAR



PIN SHOWN CONTACTING
WORN SPLINE

VIEW A





MEASUREMENT OF SQUARE END

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Fan Reverser Flexible Shaft Square Ends
Figure 601

THRUST REVERSER FLEXIBLE SHAFT - APPROVED REPAIR

1. General

A. This procedure pertains to the Approved Repair for the Thrust Reverser Flexible Shaft. Access to the Thrust Reverser Flexible Shaft is through the fan cowl doors.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C01-077	Adhesives, Plastics, Sealants (Ref. 70-00-00)
C. Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
D. Material No.C04-004	Cleaning Compounds and Solvents (Ref. 70-00-00)
E. Material No.C10-070	Miscellaneous (Ref. 70-00-00)
F.	Access Platform
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan, thrust reverser and core cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.

B. Broken Wire Braid Repair.
NOTE : The warning tag and spiral wrap may be moved to ease repair. Move them back to their original position when repairs are completed.
(1)Trim or bend broken wire strand ends flush with casing surface.
WARNING : **CLEANING SOLVENTS ARE HIGHLY FLAMMABLE, VOLATILE AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH THE SKIN.**
(2)Vapor degrease casing surface using stabilized trichloroethylene or by wiping the surface with a clean cloth saturated with trichloroethylene (C04-004).
(3)Mix the required amount of high temperature sealing compound (C01-077) per the manufacturer's instructions.
WARNING : **CLEANING SOLVENTS ARE HIGHLY FLAMMABLE, VOLATILE AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH THE SKIN.**
(4)Wipe repair area with Methyl-Ethyl-Ketone (MEK) (C04-001) or equivalent and immediately dry with a clean cloth.

(5)Apply sealing compound to cover any exposed liner and secure all loose wire ends.
(6)Wrap compound with glass fiber tape (C10-070) to prevent sealing compound from flowing during cure.
(7)Cure compound at 248°F (120°C) for four hours or compound may be cured during regular service.

D. Close-Up
(1)Remove access platform.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove safety clips and tags and close circuit breakers. Close core cowl, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

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FAN REVERSER ELECTRICAL CABLE ASSY - REMOVAL/INSTALLATION

1. General

A. Access to the fan reverser electrical cables is gained by opening the left and right fan cowls and the thrust reverser lower latch access panels.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
C.	Corrosion Resistant Steel Lockwire
D.	Torque Wrench 24-27 lbf. in. (0.27 - 0.30 m.daN)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors. (Ref. 71-13-00, P. Block 301).
(2)Install access platform.
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.
(3)Remove bolts securing stored inverted lockout plate on the left and right CDU's auxiliary drive pads.
Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Removal (Ref. Fig. 401, 402, 403)
(Ref. Fig. 404)
(1)Disconnect right reverser half cable from nacelle temperature transducer and the center drive unit. Remove cable by removing clamps, bolts, flat washers, and nuts.
(2)Disconnect left reverser half cable from the pressure switch, directional control valve and center drive unit. Remove cable by removing clamps, bolts, flat washers, and nuts.
(3)If the thrust reverser half has a locking actuator assembly (LAA) installed, do the steps that follow : (Ref. Fig. 401, 402, 403)

(Ref. Fig. 404).
(a)Disconnect the electrical cable from the LAA and the connector bracket.
(b)Remove the cable by removing the clamps, bolts, flat washers and nuts.

C. Installation (Ref. Fig. 401, 402, 403)
(Ref. Fig. 404)
(1)Route right reverser half cable through brackets on support assembly and connect to center drive unit and nacelle temperature transducer. Make certain there are no kinks or twists.
(a)Tighten connectors finger tight and wirelock.
(b)Secure cable with clamps, bolts, flat washers, and nuts. TORQUE nuts to between 24 and 27 lbf. in. (0.27 and 0.30 m.daN).
(2)Route left reverser half cable through brackets on support assembly and connect to center drive unit, pressure switch and directional pilot valve. Make certain there are no kinks or twists.
(a)Tighten connectors finger tight and wirelock.
(b)Secure cable with clamps, bolts, flat washers, and nuts. TORQUE nuts to between 24 and 27 lbf. in. (0.27 and 0.30 m.daN).
(3)If the thrust reverser half has a locking actuator assembly (LAA) installed, do the steps that follow : (Ref. Fig. 401, 402, 403) (Ref. Fig. 404).
(a)Route the cable through the brackets on the support assembly and connect the electrical cable to the LAA and the connector bracket.
(b)Tighten the connectors finger tight and wirelock.
(c)Secure the cable with clamps, bolts, flat washers, and nuts. TORQUE the nuts to between 24 and 27 lbf.in. (0.27 and 0.30 m.daN).

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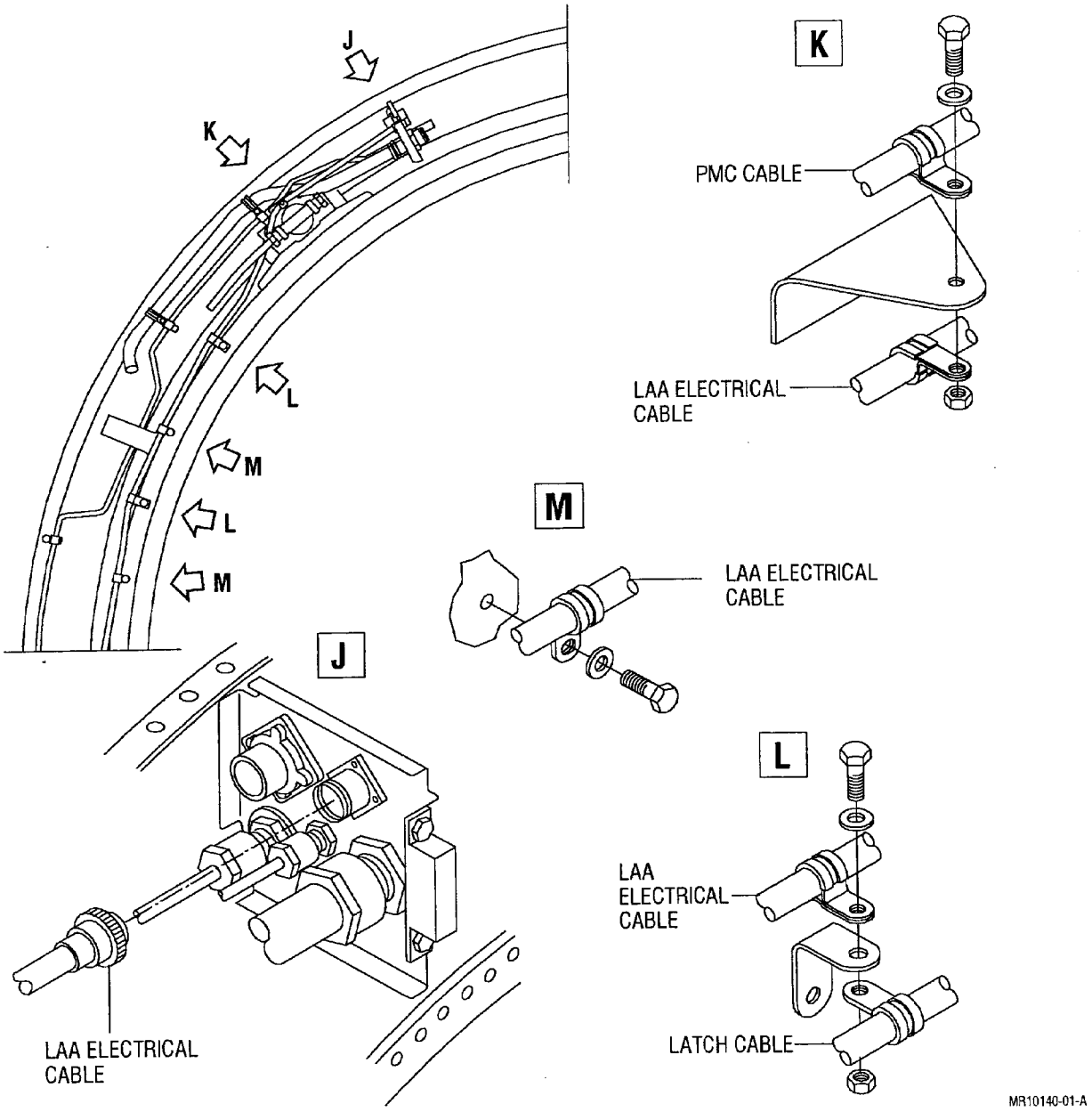
D. Close-Up
(1)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(2)Remove access platform.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Do the Thrust Reverser Functional and Indicating/Warning Sensors Test (Ref. 78-31-00, P. Block 501).
(5)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).



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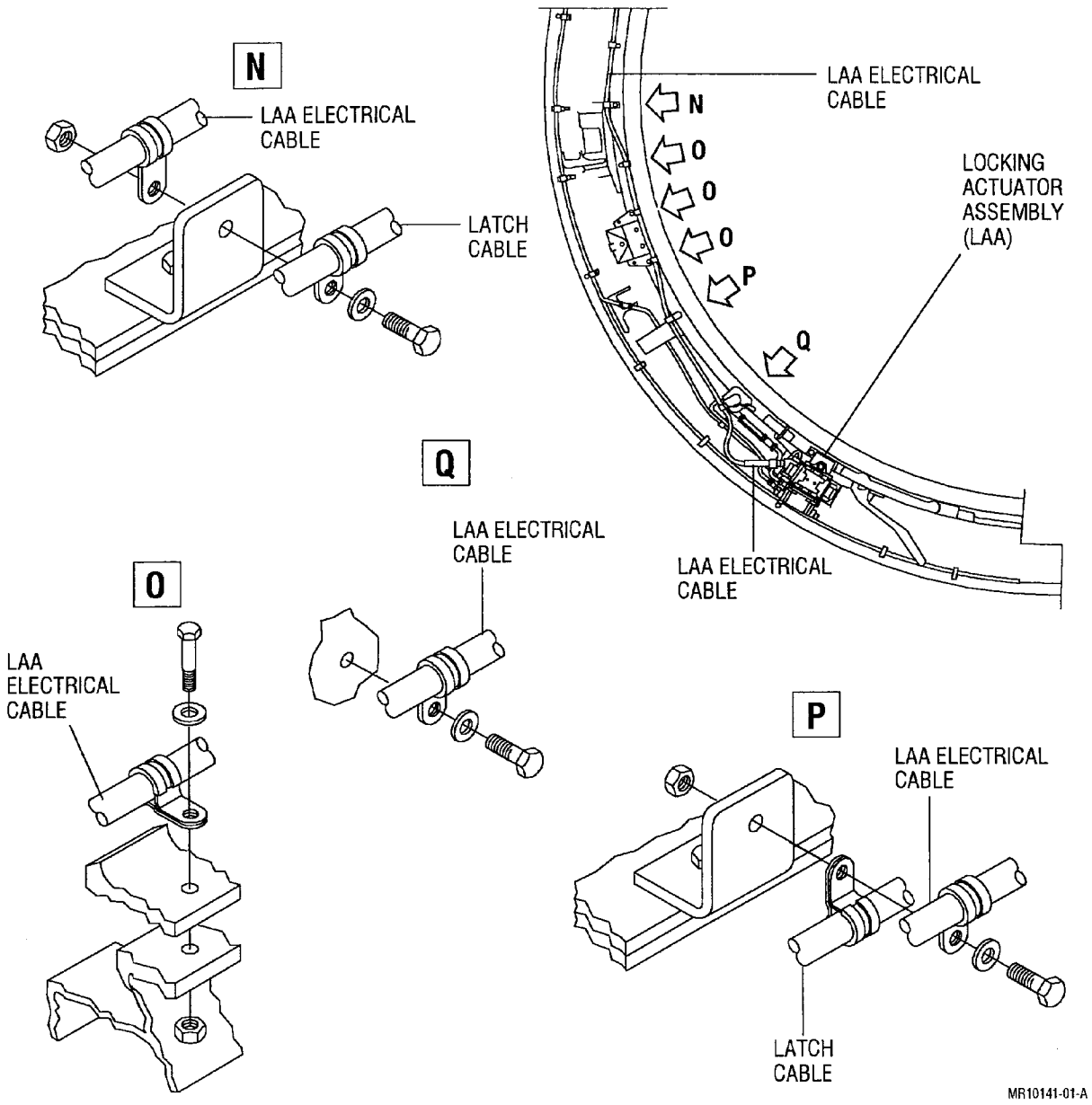
Locking Actuator Assembly Electrical Cable - Right Side
Figure 401



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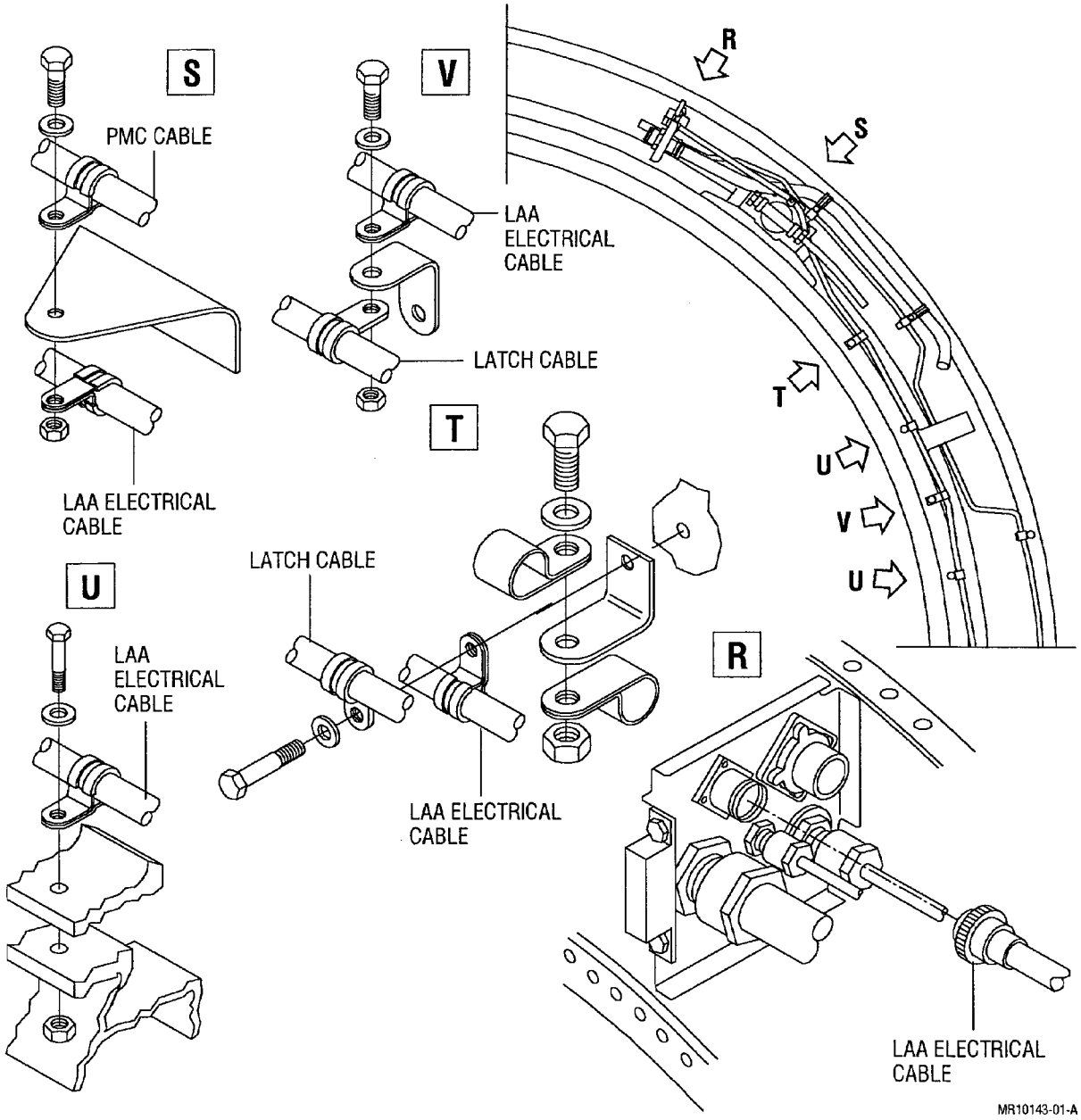
Locking Actuator Assembly Electrical Cable - Right Side
Figure 402



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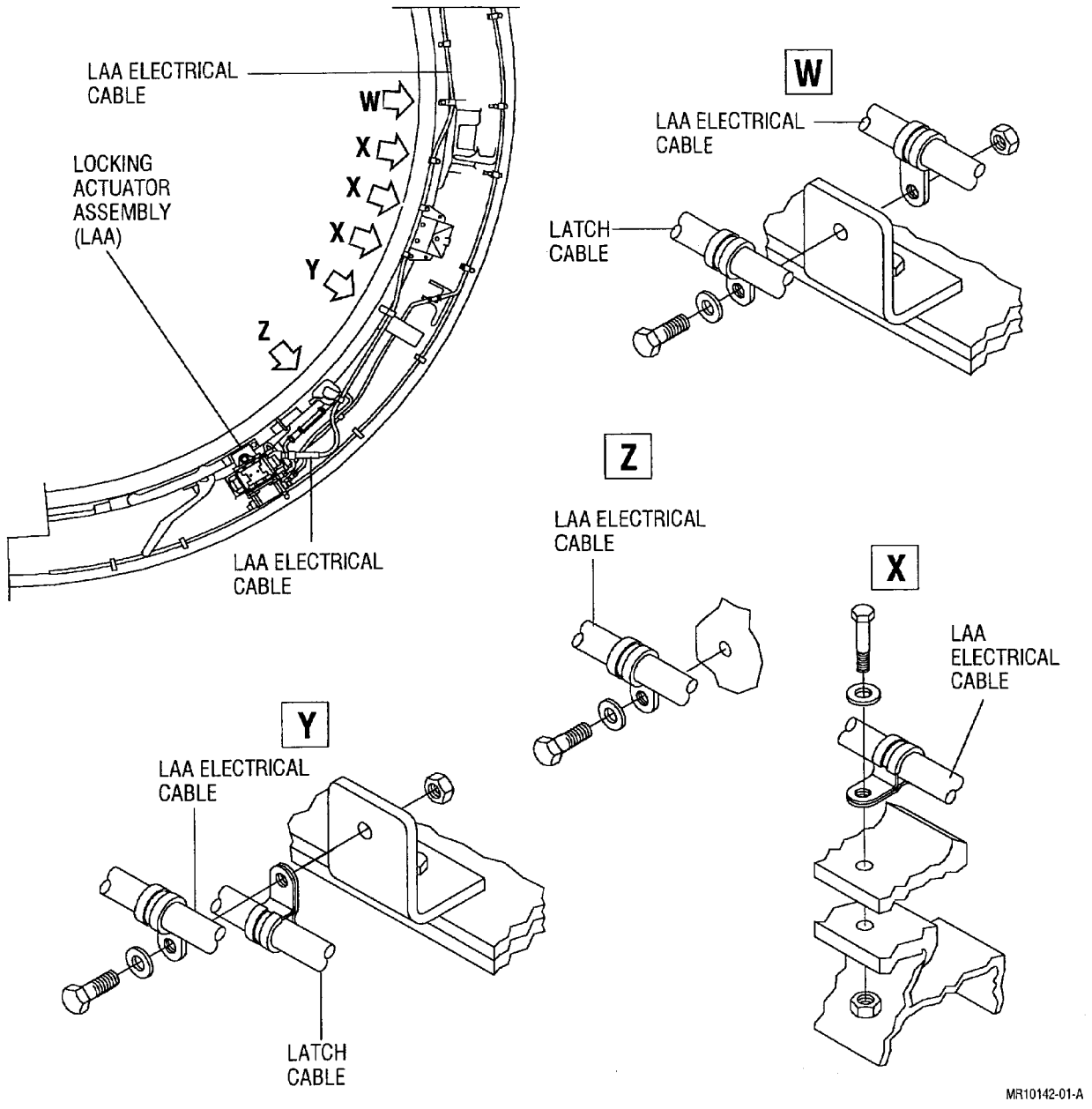
Locking Actuator Assembly Electrical Cable - Left Side
Figure 403



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Locking Actuator Assembly Electrical Cable - Left Side
Figure 404

FAN REVERSER ELECTRICAL CABLE ASSY - INSPECTION/CHECK

1. General

A. This procedure pertains to the inspection and check of the fan reverser electrical cables.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-13, P. Block 401	Fan Reverser Electrical Cable Assy
- 78-31-13, P. Block 801	Fan Reverser Electrical Cable Assy

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove electrical cables (Ref. 78-31-13, P. Block 401).

B. Visual Inspection/Check

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Metal braid for frayed or broken strands	None allowed	Repair (Ref. 78-31-13, P. Block 801).
(2)Connector for :		
(a)Thread damage	30 percent on one entrance thread or 10 percent on each of two entrance threads	Repair (Ref. 78-31-13, P. Block 801).
(b)Bent, broken, or corroded pins	None allowed	Replace cable (Ref. 78-31-13 P. Block 401).
(c)Chipped insulation between pins	Any amount provided pins are not shorted and are still in their relative positions	Replace cable (Ref. 78-31-13, P. Block 401).

C. Close-Up
(1)Install electrical cables (Ref. 78-31-13, P. Block 401).
(2)Remove safety clips and tags and close circuit breakers, close

thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

FAN REVERSER ELECTRICAL CABLE ASSY - MAINTENANCE PRACTICES

1. General

A. Maintenance of the electrical cables is limited to Removal/Installation, Inspection/Check and Approved Repairs.

2. Equipment and Materials

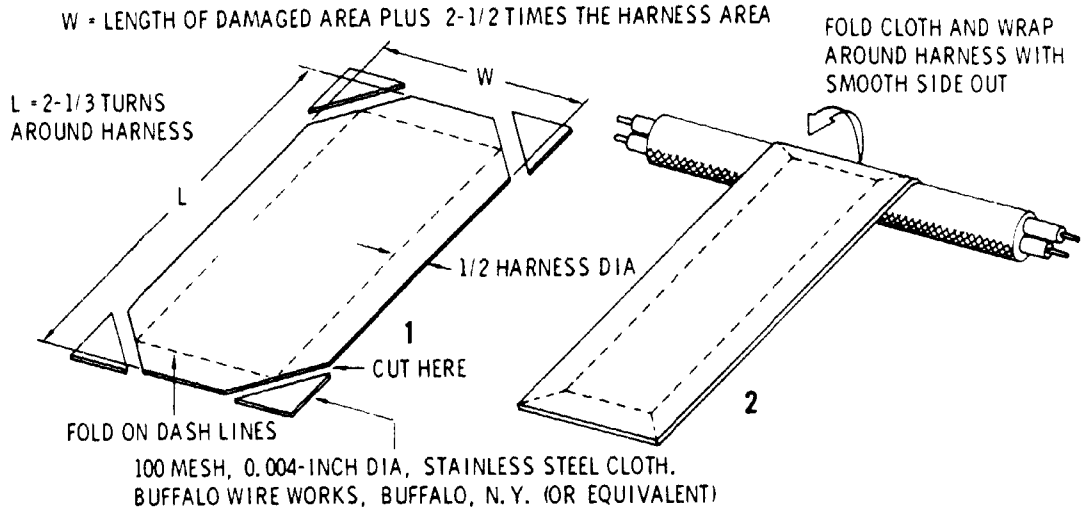
ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C03-006	Finishes and Protective Coatings (Ref. 70-00-00)
C.	Corrosion Resistant Steel Lockwire
D.	Access Platform
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

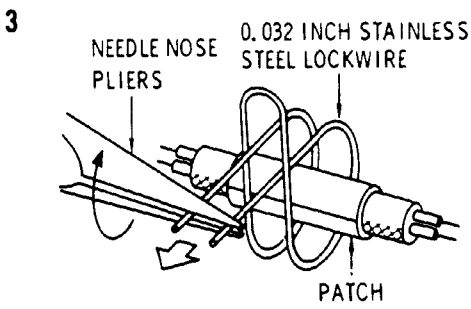
3. Procedure

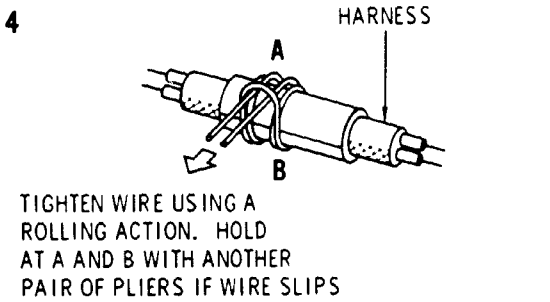
A. Job Set-Up
(1)Open, safety and tag the appropriate circuits breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.

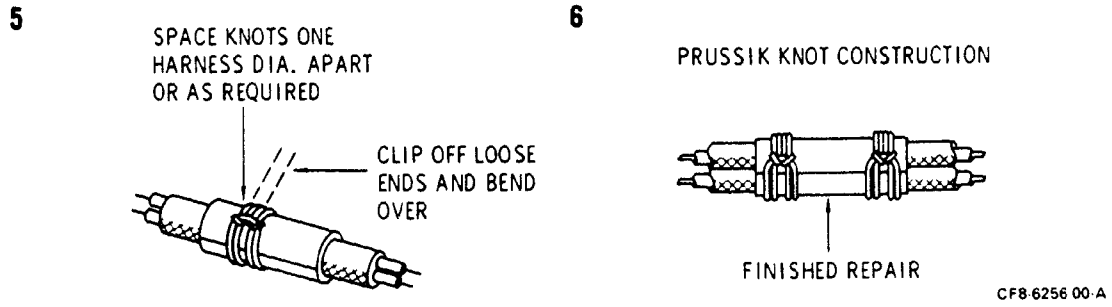
B. Approved Repairs (Ref. Fig. 801)
(1)Thread damage repair.
(a)Blend threads within serviceable limits with a fine file.
(b)Coat bare areas with Alodine (C03-006).
(2)Shielding Repair.
(a)Repair shielding as shown (Ref. Fig. 801).

C. Close-Up
(1)Remove access platform.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. BLock 301).


W = LENGTH OF DAMAGED AREA PLUS 2-1/2 TIMES THE HARNESS AREA
L = 2-1/3 TURNS AROUND HARNESS
W
L
1/2 HARNESS DIA
1
CUT HERE
FOLD ON DASH LINES
FOLD CLOTH AND WRAP AROUND HARNESS WITH SMOOTH SIDE OUT
2
100 MESH, 0.004-INCH DIA, STAINLESS STEEL CLOTH.
BUFFALO WIRE WORKS, BUFFALO, N.Y. (OR EQUIVALENT)







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Shielding Repair
Figure 801

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PNEUMATIC CHECK VALVE - REMOVAL/INSTALLATION

1. General
The ground (Y) check valve is mounted at approximately the 2 o'clock position on the high pressure compressor stator case.

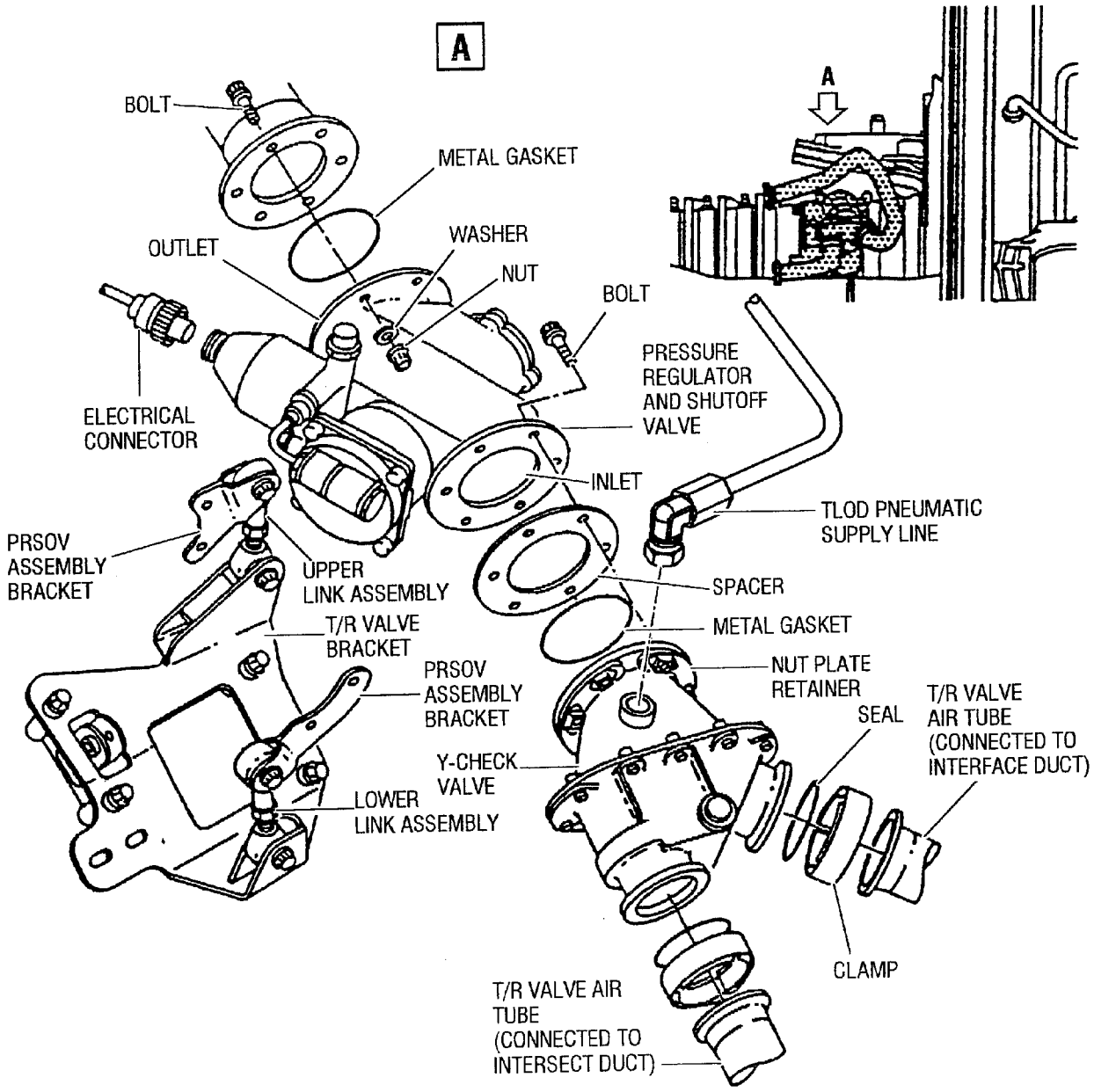
2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench 55-70 lbf.in. (0.62-0.79 m.daN)
C.	Corrosion Resistant Steel Lockwire
D. AN929-665	Pneumatic Cap
E.	Access Platform
F.	Metal Gasket
G.	Warning Notices
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-05, P. Block 401	Pressure Regulating and Shut-Off Valve

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform
(3)On panel 436VU :
- Make certain that APU bleed load valve control switch (40HB) is in CLOSE position and install a warning notice to tell persons not to use it.
- Make certain that X BLEED VALVE control switch (39HB) is in CLOSE position and install a warning notice to tell persons not to use it.
(4)Make certain that a warning notice is installed on the HP ground connector to tell persons not to use it.

B. Removal (Ref. Fig. 401)
(1)Remove the couplings and seals that connect the T/R valve air tubes to the Ground (Y)-Check Valve.
(2)Disconnect the TLOD pneumatic supply line from the Y-check valve.
(3)Remove the bolts and nuts that connect the Y-Check Valve to the Pressure Regulator and Shutoff Valve (PRSOV). Keep the spacer, the bolts, and the nuts to use again. Discard the metal gasket.
(4)Remove the Y-Check Valve.



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Ground (Y) Check Valve - Removal/Installation
Figure 401

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C. Installation (Ref. Fig. 401)
(1)Clean the surfaces of the mating flanges on the Y-Check Valve and the PRSOV.
(2)Install the spacer and new metal gasket on the PRSOV.
(3)Install the Y-Check Valve with the bolts and nuts.
Make certain you attach the PRSOV assembly bracket at this time.
(4)TORQUE the bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(5)Connect the T/R valve air tubes to the Y-Check Valve with the couplings and seals (Ref. 78-31-05, P. Block 401).
NOTE : It is critical that the T/R valve air tubes be installed as referenced.
(6)Install the TLOD pneumatic supply line port on Y-check valve. TORQUE the nut to between 350 and 420 lbf.in. (3.92 and 4.70 m.daN). Lockwire the installation nut.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Remove safety clips and tags and close circuit breakers. Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove warning notices from panel 436VU and HP ground connector.

PNEUMATIC CHECK VALVE - INSPECTION/CHECK

1. General
This procedure pertains to the inspection and check of the ground (Y) check valve.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-14, P. Block 401	Pneumatic Check Valve

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove ground (Y) check valve (Ref. 78-31-14, P. Block 401).

B. Visual Inspection/Check

Inspect/Check	Maximum Serviceable Limits	Remarks
(1)Mounting surfaces for nicks, dents, or scratches	Any amount not exceeding 10 percent of the flange thickness after removal of high metal and blending	Replace valve (Ref. 78-31-14, P. Block 401)
(2)Mating flanges for nicks, dents or scratches	Any number 0.010 in. (0.254 mm) deep not completely across mating surface	Replace valve (Ref. 78-31-14, P. Block 401)
(3)Housing for nicks, dents, or scratches	Any amount not exceeding 10 percent of housing thickness	Replace valve (Ref. 78-31-14, P. Block 401)
(4)T/R valve air tube mating surface for nicks, dents and scratches	Any amount not exceeding 10 percent of the flange thickness after removal of high metal and blending	Replace valve (Ref. 78-31-14, P. Block 401)
(5)T/R valve air tubes mating flange for cracks	None allowed	Replace valve (Ref. 78-31-14, P. Block 401)

C. Close-Up

(1)Install ground (Y) check valve (Ref. 78-31-14, P. Block 401).

(2)Close fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
Remove safety clips and tags and close circuit breakers.

**ON A/C 001-100,

R

LOCKING ACTUATOR ASSEMBLY (LAA) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. 2C6367	Tool Install/Remove - Pin, Fan Reverser Actuator
C.	Corrosion Resistant Steel Lockwire
D. Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
E. Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
F. Material No.C02-027	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
G. Material No.C02-057	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control
- 78-31-02, P. Block 401	Ballscrew Actuator

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal
NOTE : The locking actuator assembly (LAA) and the ballscrew actuator must be removed as an assembly.
(1)Remove the transcowl cover plate screws and the cover plate. (Ref. Fig. 401)
(2)Release the Center Drive Unit (CDU) brake by pulling the handle out, away from the CDU (approximately 60°) until a flat is felt.
(3)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 402)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.
(4)Remove the two bolts that secure the lockout plate to the CDU and remove the plate.
(5)Install a 0.25 in. (6.25 mm) square drive handle into the auxiliary drive pad. Crank the reverser toward deploy far enough to expose the ballscrew actuator clevis pin.
WARNING : FAILURE TO DEACTIVATE THE THRUST REVERSER HALF FOR GROUND

MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(6)Install the lockout plate square drive into the CDU manual drive pad and secure it with the bolts removed in step (3). TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(7)Disconnect the electrical harness plug from the LAA. (Ref. Fig. 403)
(8)Disconnect the pneumatic tube from the LAA.
(9)Open the quick release clamps securing the flexshafts.
(10)Cut and remove the lockwire and remove the bolts that attach the flexshaft to the angle gearbox.
(11)Pull the flexshaft from the gearbox and stow to prevent the core from sliding out.

CAUTION : DO NOT REMOVE THE CLEVIS PIN RETAINING CLIP BOLT. BACK THE BOLT OUT ONLY ENOUGH TO ROTATE THE RETAINING CLIP. REMOVAL OF THE BOLT WILL DAMAGE THE NUT PLATE.

(12)Loosen the bolt that attaches the clevis pin retaining clip and turn the retaining clip 90°.
(13)Remove the internally threaded clevis pin by inserting the slide hammer tool 2C6367 and tapping the pin out.
(14)If the translating cowl clevis pin cannot be removed from the outer side of the translating cowl, use the following procedure to remove the clevis pin from the inner side of the translating cowl (Ref. Fig. 403). Otherwise, go to paragraph (15).
(a)Get access to the inner side of the translating cowl.
(b)Remove the sealant and get access to the rod end bearing pin access cap at the ballscrew actuator.
(c)Remove the rod end bearing pin access cap.
(d)Remove the inner retainer.
(e)Use the pin install/remove tool 2C6367 to remove the clevis pin that attaches the ballscrew actuator to the translating cowl.
(15)Remove bolts, washers and nuts from actuator pin retaining clips.
(16)Remove the clips and mounting pins.
(17)Carefully remove the locking actuator assembly.

Pre GE SB 78-152

(18)Measure and record the distance from the centerline of the gearbox gimbal mounting hole to the centerline of the ballscrew rod-end bearing.

End Pre GE SB 78-152

**ON A/C 001-100,

R

C. Installation (Ref. Fig. 401)
(1)Manually unlock the locking actuator assembly (LAA) as follows : (Ref. Fig. 402)
(a)Push in the two buttons located on the LAA manual release lever.
(b)Pull the release lever up and away from the LAA until the two buttons click into position and you can see the green stripes on the buttons.

Pre GE SB 78-152

CAUTION : IN THE FOLLOWING STEP, AFTER THE ROD-END BEARING HAS BEEN ADJUSTED, A 0.055 (1.40 MM) DIA. PIN MUST NOT BE ABLE TO PASS THROUGH THE WITNESS HOLE.

R Pre MRAS SB 78-1028

R (2)After the completion of the rod end adjustment, tighten the jam nut. Do not let the rod-end turn while you tighten the jam nut. TORQUE the jam nut to between 180 and 220 lbf.in. (2.03 and 2.48 m.daN) and wirelock.

R End Pre MRAS SB 78-1028

R Post MRAS SB 78-1028

R (2)After the completion of the rod end adjustment, tighten the jam nut. Do not let the rod-end turn while you tighten the jam nut. TORQUE the jam nut to between 500 and 520 lbf.in. (5.65 and 5.88 m.daN) and wirelock.

R End Post MRAS SB 78-1028

End Pre GE SB 78-152

(3)Insert the rod-end through the protective pan and towards the transcowl clevis.

(4)Insert the transcowl clevis pin.

NOTE : If the clevis pin was removed from the inner side of the translating cowl, do steps 2.C.(7) through 2.C.(7)(h).

(5)Position the retaining clip over the clevis pin and TORQUE bolt to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

(6)Install the transcowl cover plate. TORQUE the plate screws to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(7)If the clevis pin was removed from the inner surface of the translating cowl, install the clevis pin as follows (Ref. Fig. 404).
Otherwise, go to paragraph (9).

(a)Align the ballscrew rod end bolt hole with the translating cowl clevis bolt hole.

(b)Get access to the inner surface of the translating cowl. Install the clevis pin through the ballscrew rod end bolt hole and the clevis bolt hole.

WARNING : MATERIAL NO.C02-057 IS AN AGENT THAT IS AN IRRITANT, MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-057 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-057 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA.
- APPROVED SAFETY EQUIPMENT.
- EMERGENCY MEDICAL AID.
TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(c)Lubricate the threads of the inner retainer with Material No.C02-057.

(d)Install the inner retainer.

WARNING : MATERIAL NO.C02-057 IS AN AGENT THAT IS AN IRRITANT, MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-057 IS USED.

- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-057 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA.
- APPROVED SAFETY EQUIPMENT.
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(e)Lubricate the threads of the rod end bearing pin access cap with Material No.C02-027.

(f)Install the rod end bearing pin access cap.

(g)TORQUE the rod end bearing pin access cap to between 76 and 100 lbf.in. (0.86 and 1.13 m.daN).

WARNING : MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE THAT ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA.
- APPROVED SAFETY EQUIPMENT.
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(h)Apply Material No.C01-073 or Material No.C01-115 fully on the rod end bearing pin access cap.

CAUTION : MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE THAT ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS USED.

(8)Install the mounting pins through the bracket into the gearbox.

(9)Install the retaining clips with the washer under the clip and secure with the bolts, washers and nuts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(10)Connect the electrical harness plug to the LAA (Ref. Fig. 403).

(11)Connect the pneumatic tube to the LAA. TORQUE to between 262 and 308 lbf.in. (29.4 and 34.5 m.daN).

(12)Insert the flexshaft into the gearbox as applicable and install attaching bolts. TORQUE bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN) and wirelock.

(13)Secure the flexshaft with quick release clamps.

(14)Remove the two bolts securing the lockout plate (on the CDU) and remove the plate.

(15)Rig the reverser actuation system (Ref. 78-31-00, P. Block 501).

(16)Manually lock the locking actuator assembly (LAA) as follows :

(Ref. Fig. 402)

(a)Push in the two buttons located on the LAA manual release lever.

(b)Push the release lever down toward the LAA until the two buttons click into position and you can see the green stripes on the buttons.

(17)Move the manual brake release lever into its retaining clip to engage the CDU brake.

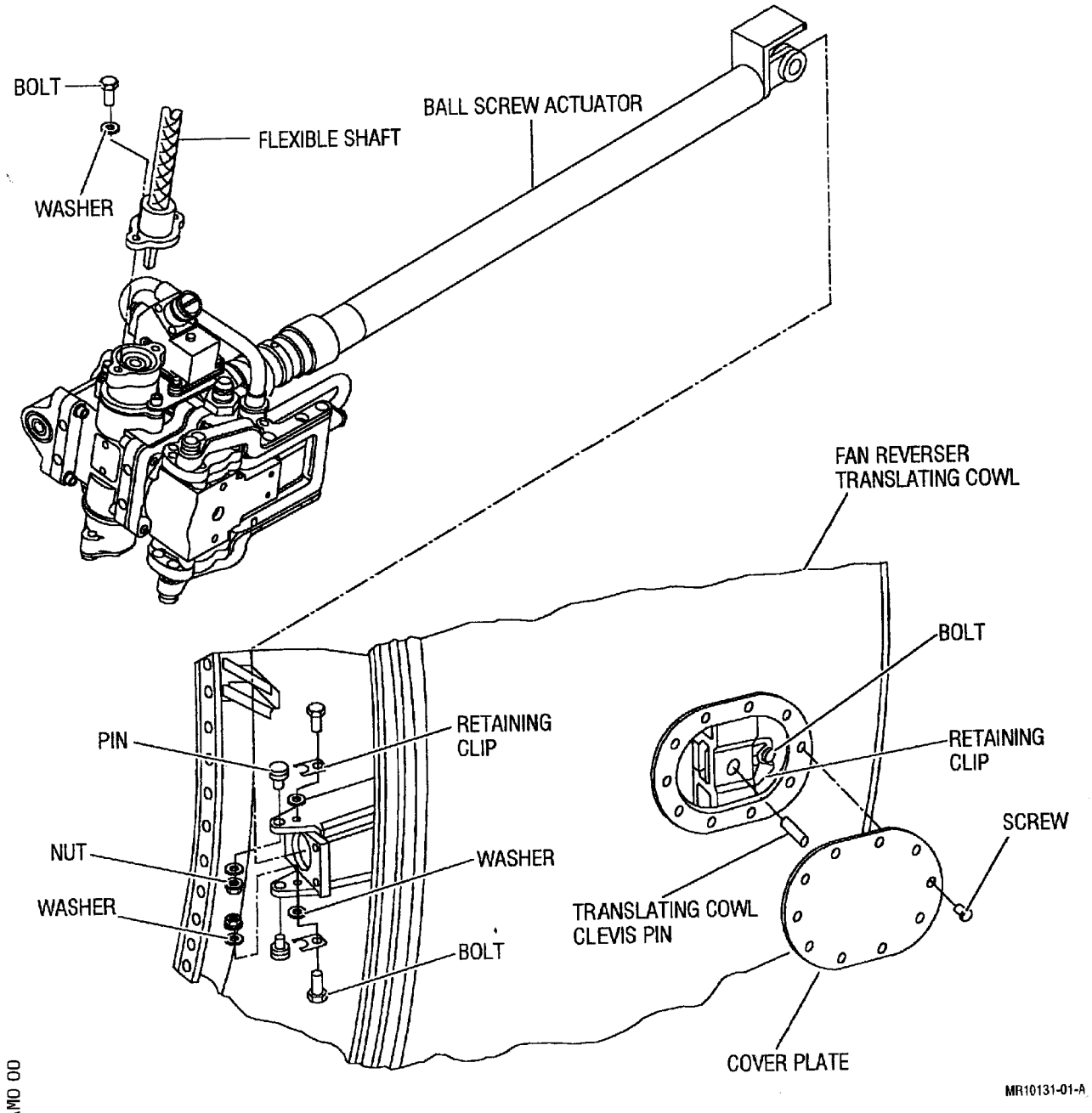
D. Close-Up

(1)Install the lockout plate with the square drive exposed onto the CDU manual drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(2)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(3)Remove safety clips and tags and close the circuit breakers.

(4)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).



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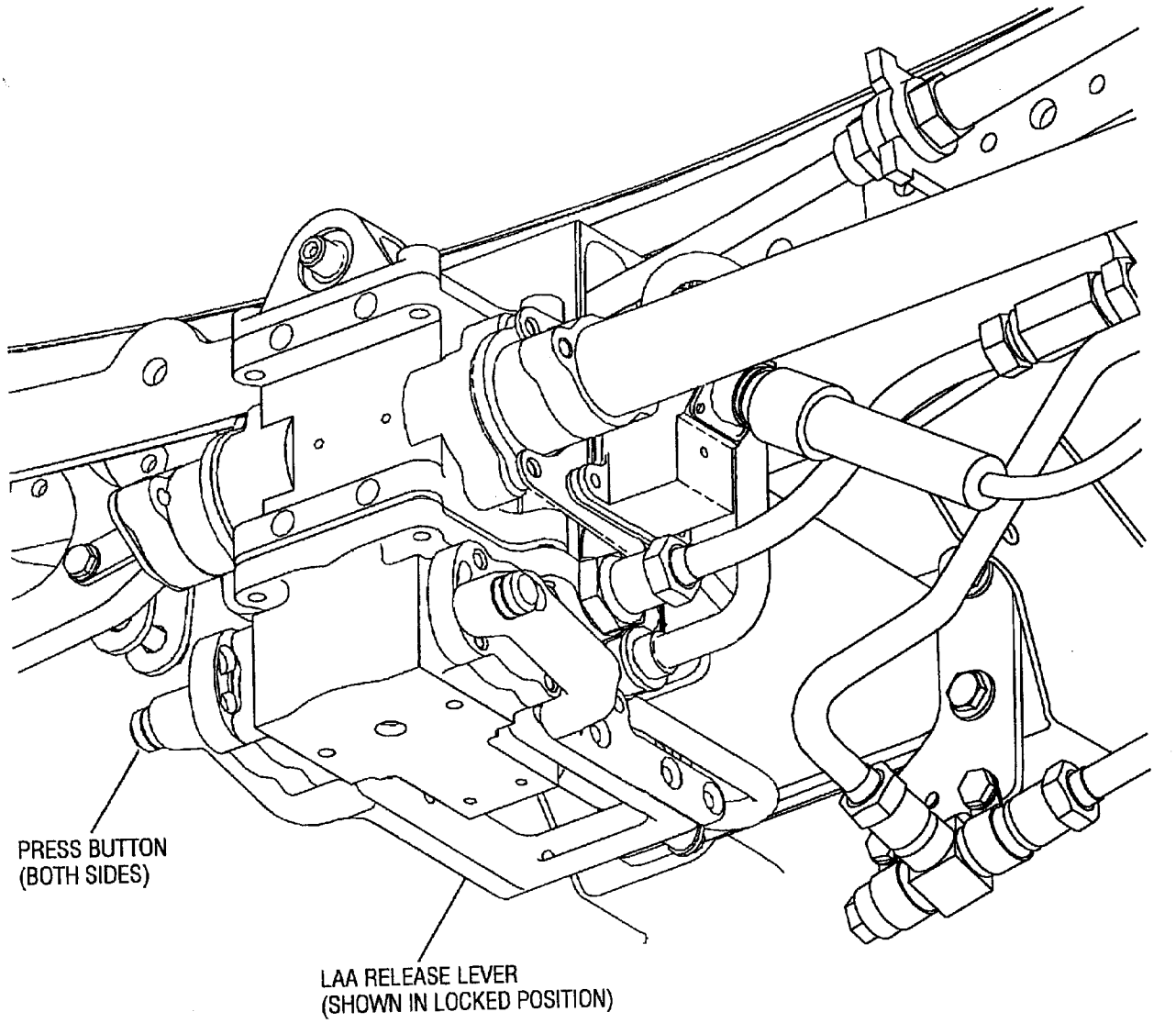
Locking Actuator Assembly
Figure 401



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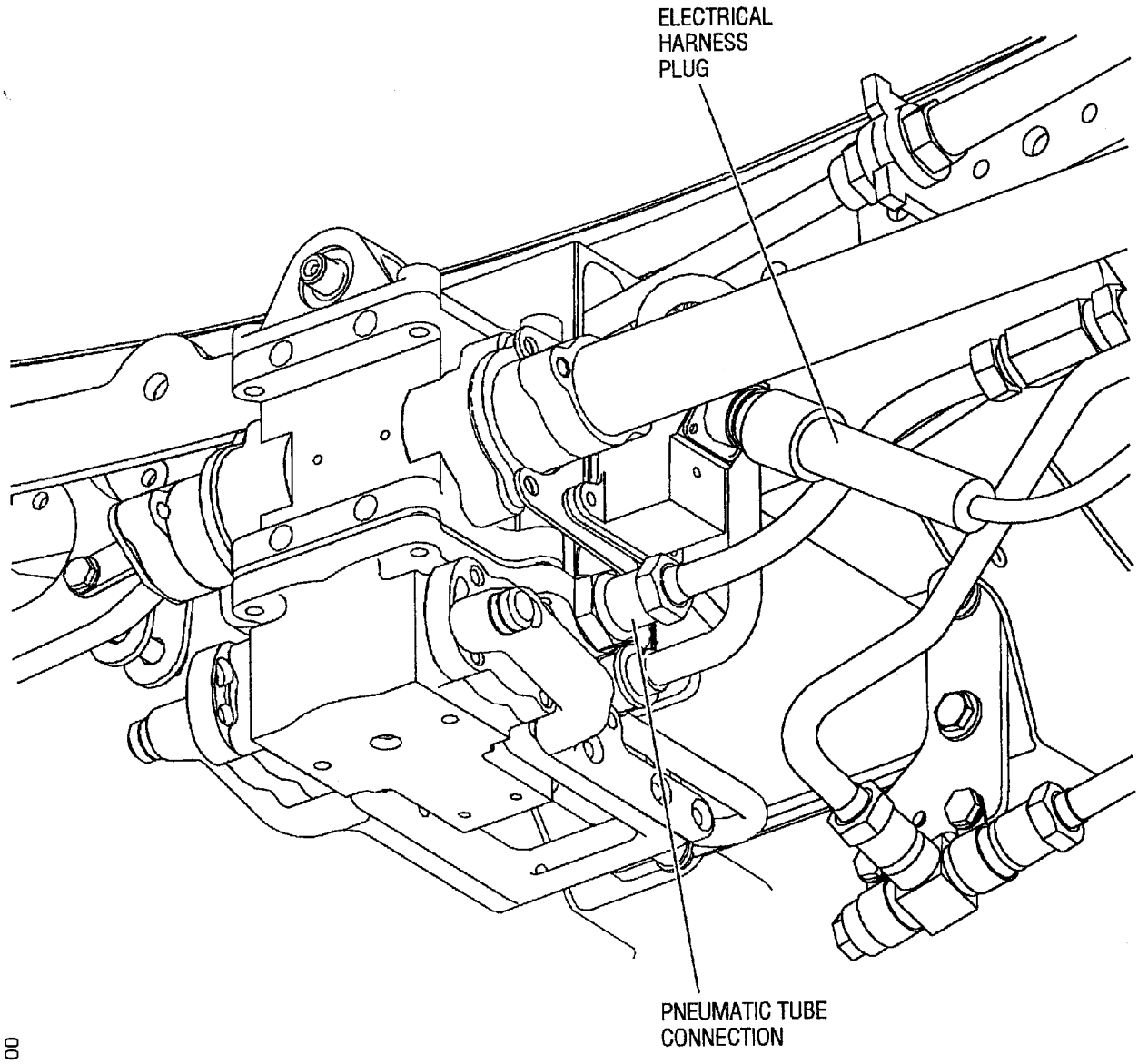
Locking Actuator Assembly Connections
(Adjustable Length LAA Shown)
Figure 402



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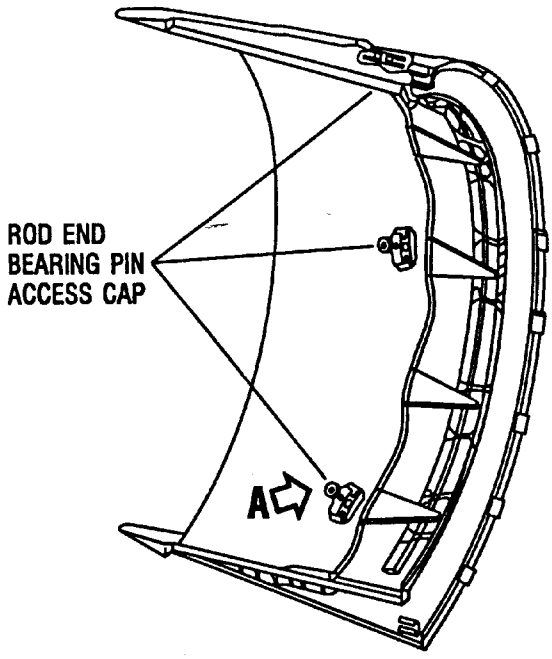
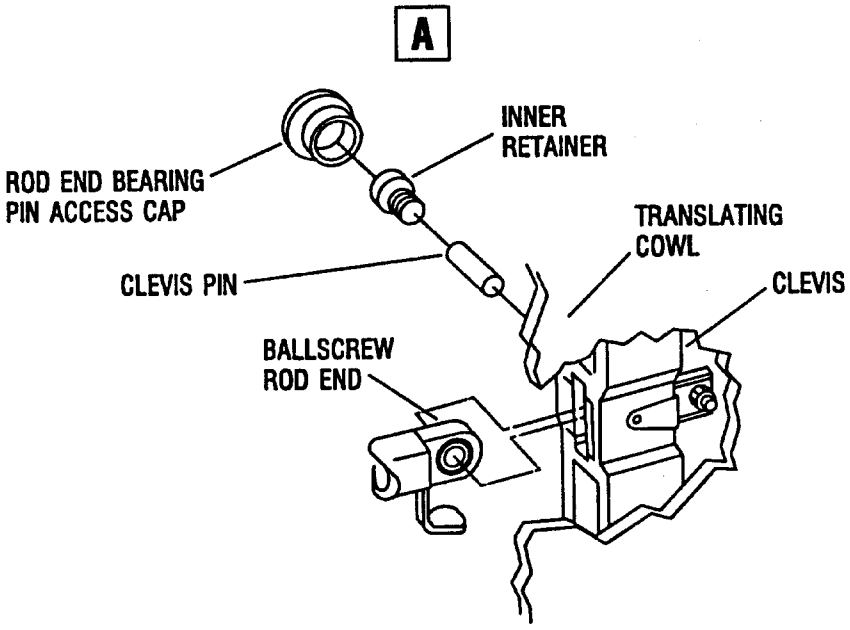
Locking Actuator Assembly Connections
Figure 403





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Clevis Pin - Alternative Removal Method
Figure 404

**ON A/C 001-100,

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LOCKING ACTUATOR ASSEMBLY (LAA) - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-51, P. Block 401	Locking Actuator Assembly

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Inspection/Check (Ref. Fig. 601)

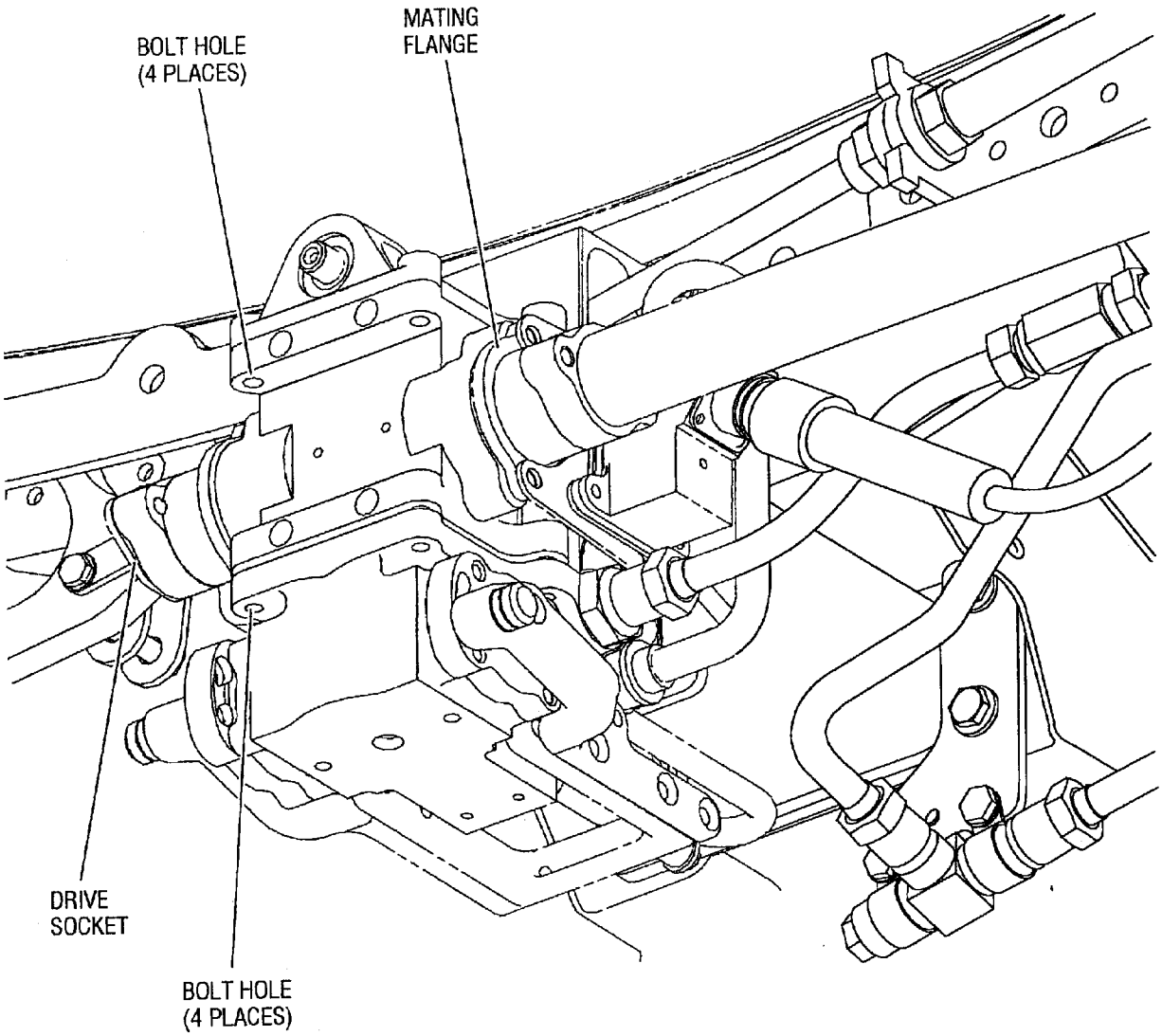
INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Drive sockets for end play	0.005 in. (0.127 mm) maximum	Replace locking actuator assembly (Ref. 78-31-51, P. Block 401).
(2) Mounting gimbals for wear	None allowed	Replace locking actuator assembly (Ref. 78-31-51, P. Block 401).
(3) Flexible shaft mating flanges for nicks or scratches	Any amount not exceeding 0.030 in. (0.75 mm) depth or diameter after removal of high metal and blending	Replace locking actuator assembly (Ref. 78-31-51, P. Block 401).
(4) Bolt holes for cracks	None allowed	Replace locking actuator assembly (Ref. 78-31-51, P. Block 401).
(5) Housing for nicks, dents, or scratches	Any number not exceeding 0.030 in. (0.75 mm) depth or diameter after removal of high metal	Replace locking actuator assembly (Ref. 78F-31-51, P. Block 401).

C. Close-Up

(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(2)Remove safety clips and tags and close the circuit breakers.

(3)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).



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Locking Actuator Assembly Inspection/Check
Figure 601

**ON A/C 001-100,

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LOCKING ACTUATOR ASSEMBLY (LAA) - APPROVED REPAIRS

1. General
This procedure has the approved repairs of the locking actuator assembly (LAA). To get access to the LAA, open one of the two fan cowl doors.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C01-087	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open the fan cowl doors (Ref. 71-13-00, P. Block 301).
WARNING : FAILURE TO DEACTIVATE THE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRCRAFT/EQUIPMENT.
(2)Remove the bolts that attach the stored inverted lockout plate to the left and right CDU's auxiliary drive pads.
(3)Install the lockout plate square drive into the auxiliary drive pad and attach with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Repair of Damaged Inserts
(1)Coat the new insert pin with Material No.C01-087 and install.
(2)Remove the insert tang when the insert is 1/4 to 1/2 turn below the countersink.
(3)Let the primer cure at room temperature for 24 hours before using the insert.

C. Close-Up
(1)Remove the bolts that attach the lockout plate to the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with the removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(2)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close the thrust reverser and fan cowl doors

(Ref. 71-13-00, P. Block 301).

(4)Remove the safety clips and tags and close the circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.

FAN REVERSER ASSEMBLY - DESCRIPTION AND OPERATION

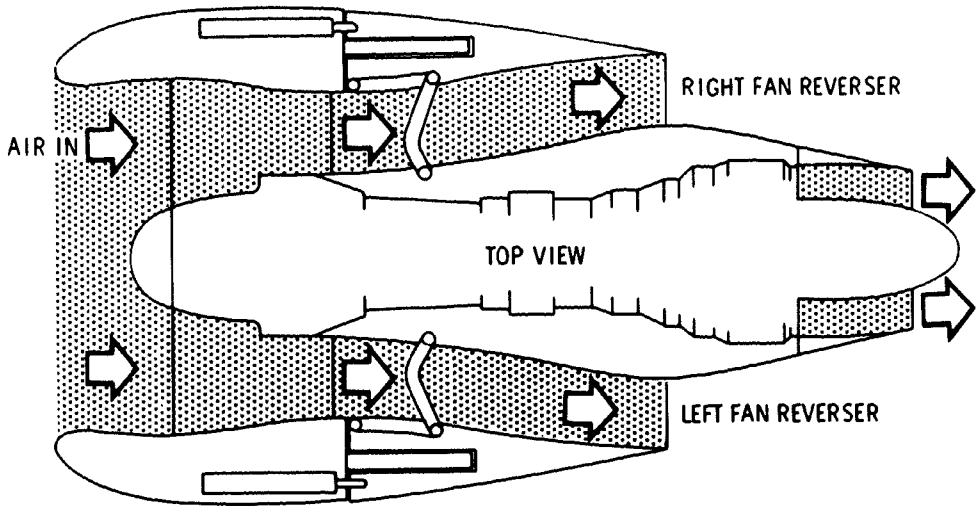
1. General (Ref. Fig. 001)
The fan reverser assembly is located directly aft of and is clamped to the aft fan case. It forms a bifurcated duct for fan exhaust when the separate left and right hand assemblies are latched in place. (For fan reverser cowl description refer to chapter 71-13).
Each reverser half consists of a fixed structure which houses the deflector vanes, provides attachment points for the actuation hardware and supports the translating cowl. The translating cowl houses six hinged blocker doors. Three ball screw actuators operate the translating cowl. In forward thrust configuration, the translating cowl is in the forward, stowed position covering the outer surface of the vaned deflectors. The blocker doors are faired into the outer fan duct wall in the stowed position so that in reverse thrust configuration the translating cowl is moved aft to expose the deflectors, while the blocker doors rotate inwards against the inner wall of the fan air duct. Normal fan airflow is thus blocked and directed through the deflectors.

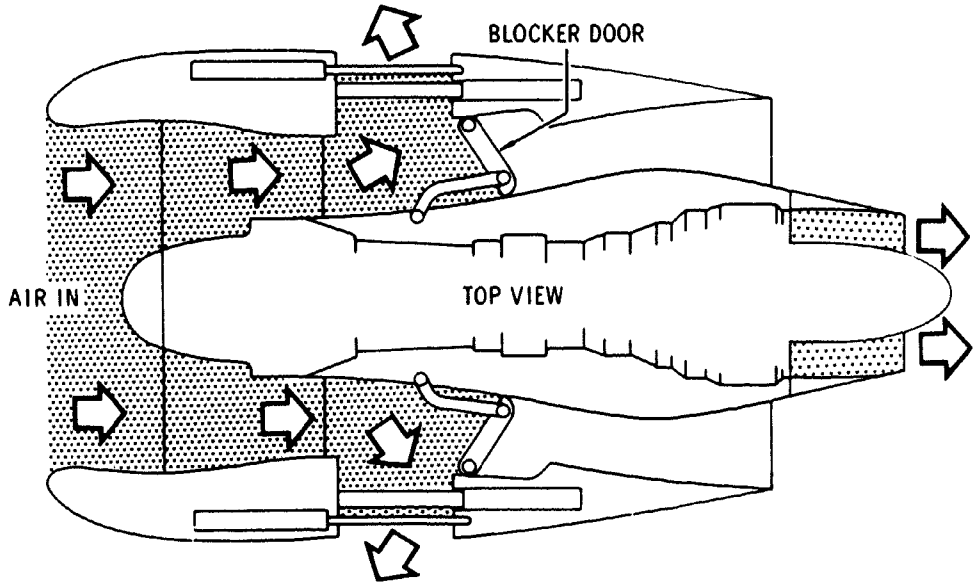
2. Description (Ref. Fig. 002)
The fan reverser components are the following ones :

A. The fixed structure (support assembly).
The various parts are riveted, bolted, bonded or welded together to form a single structure.

B. Translating cowl
It provides an outer flow path for the fan air, a smooth low drag outer cowl and a pocket to enclose the vaned deflector assembly in the stowed position.

C. Blocker doors (Ref. Fig. 003)
There are twelve blocker doors (six in each half) and there are five patterns of blocker doors : standard, upper left and right, lower left and right.
They are pivoted into the fan air to exit through the vaned deflector assembly.





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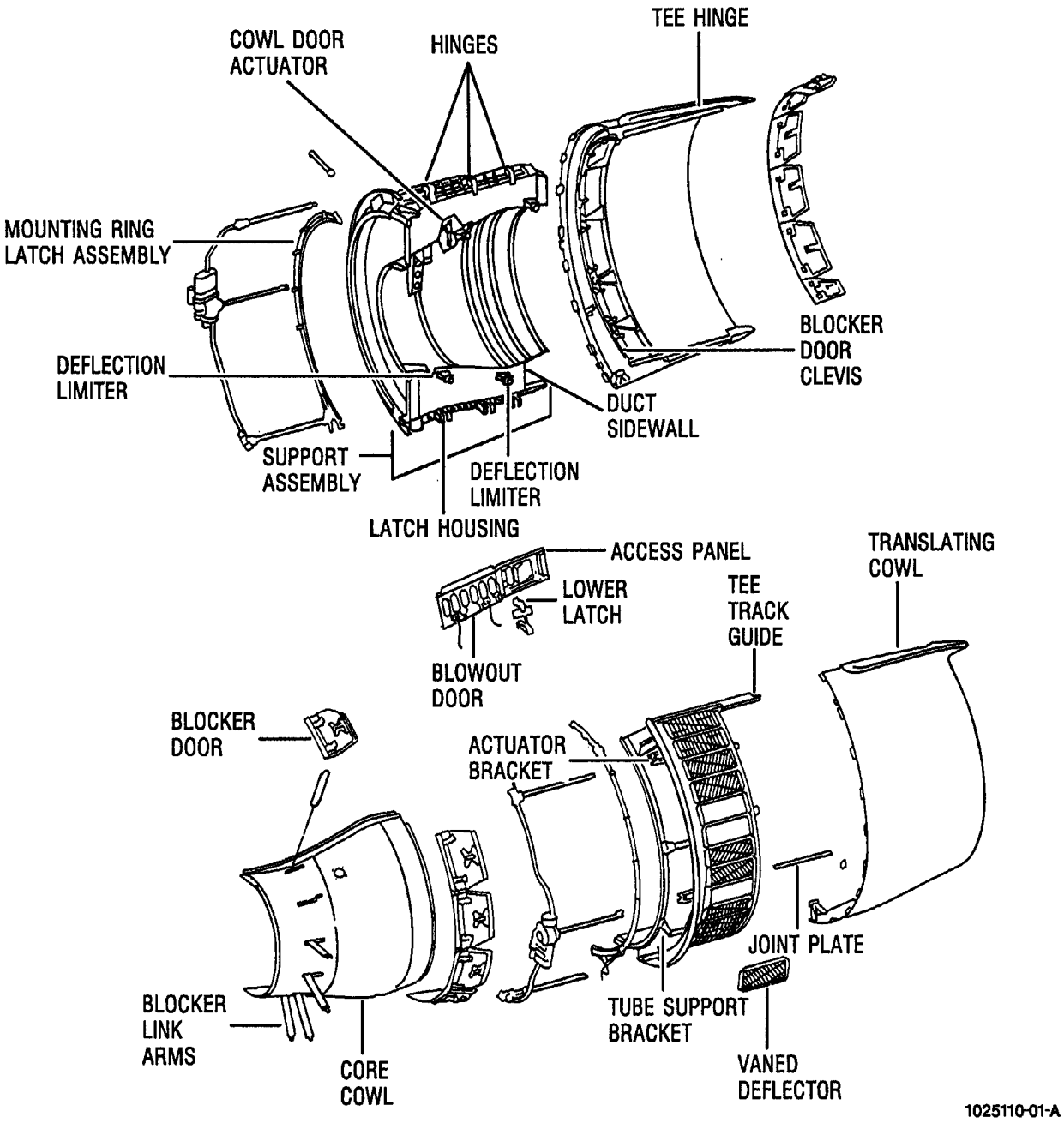
DM5

Exhaust
Figure 001



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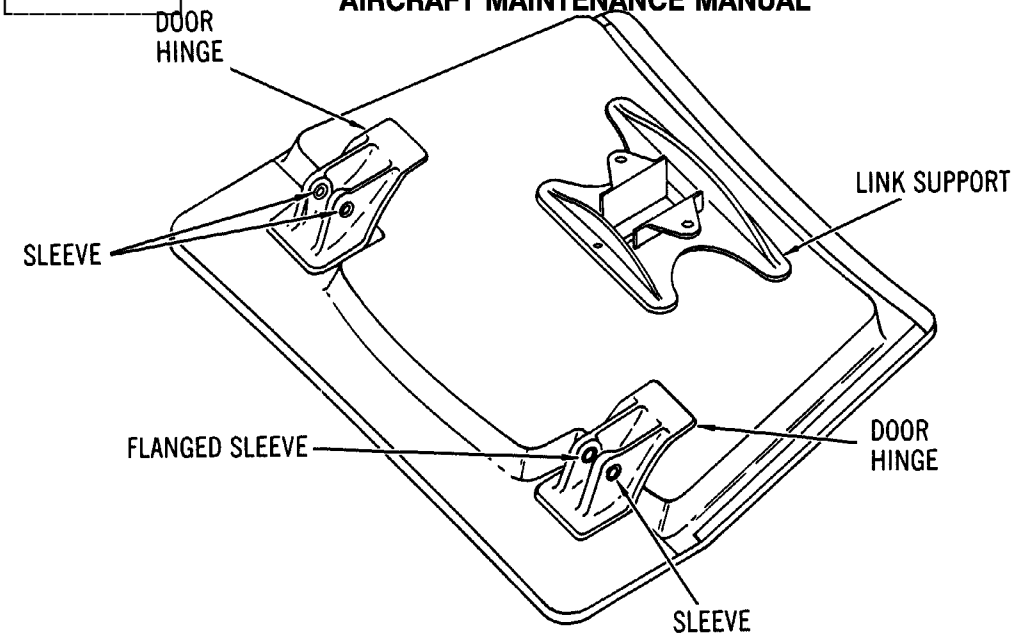
Thrust Reverser Assembly
Figure 002



BMS 78 32 00 0 LEMO - 01

Blocker Door
Figure 003

R FAN REVERSER ASSEMBLY - REMOVAL/INSTALLATION (FEEDBACK UNIT)

1. General

A. The Feedback Unit is located on each Center Drive Unit on both thrust reverser halves. Forward looking aft, the right hand center drive unit is located on the left side of the engine and the left hand center drive unit is located on the right side of the engine.

B. The Feedback Unit is removed and installed as an assembly. No disassembly of the Feedback Unit is permitted at the line maintenance level. Disassembly of the Feedback Unit is permitted only at the shop level.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
or	
Material No.C04-004	Cleaning Compounds and Solvents (Ref. 70-00-00)
B. Material No.C01-145	Adhesives, Plastics, Sealants (Ref. 70-00-00)
C.	Torque Wrench 14 - 860 lbf.in. (0.271 - 9.7 m.daN)
D.	Depth Micrometer 3 in. (76.2 mm)
Referenced Procedure - 78-31-01, P. Block 401	Center Drive Unit

3. Procedure

A. Job Set-Up
(1)Remove the Center Drive Unit (Ref. 78-31-01, P. Block 401).

B. Removal
(Ref. Fig. 401, 402, 403)
(Ref. Fig. 404)
(1)Put the Center Drive Unit in the stow rig position.
(a)To manually release the CDU brake, put the break at the detent angle of approximately 60 degrees (until a flat is felt) with the body of the CDU.
NOTE : At any other brake lever position, the brake will be applied.
(b)Install a 0.25 in. (6.4 mm) square drive speed handle into the auxiliary drive pad. Hand crank the CDU until it approaches the "near stow" position indicated by a forward movement of the feedback stop rod.
(c)Apply and hold finger pressure on the stow "rig indicator" button (Ref. Fig. 402) (Detail A).
(d)Slowly handcrank the CDU to the stow position. The stow position is

reached when the indicator pin is fully engaged in the stow position indicator detent (Ref. Fig. 402) (Detail A).

NOTE : The indicator pin can be seen through the rig inspection window (Ref. Fig. 402, 404).

(e)Place manual brake release lever to the normally secured position.

(2)Remove the hex head bolts (1, 2) that hold the Feedback Unit on the CDU.

(3)Remove the Feedback Unit from the CDU.

C. Installation (Ref. Fig. 401)

NOTE : The left and right feedback units are different : on the left feedback unit the feedback cable threaded housing is on the same side as the drive unit mount pad; on the right feedback unit the feedback cable threaded housing is on the side opposite the drive unit mount pad.

(1)Prepare the center drive unit (CDU).

(a)Put the CDU brake handle to the detent angle of approximately 60 degrees with the body of the CDU (until you feel a flat). This releases the CDU brake.

(b)Make sure the CDU is in the stow rig position (Ref. Fig. 402, 404).

NOTE : The stow rig position of the CDU, from the mounting flange to the center of the tube assembly bearing bore must be between 24.349 and 24.353 in. (618.47 and 618.57 mm).

1 Remove the two bolts and remove the lockout plate from the auxiliary drive pad of the CDU.

2 Put a 0.25 in. (6.4 mm) square drive adapter in the auxiliary drive pad.

3 Manually turn the CDU to the stow rig position.

4 Push the button on the stow rig position indicator to make sure the CDU is in the stow rig position. The button must depress into the groove on the ballscrew as seen through the indicator window. Make sure the indicator pin is fully engaged in the stow indicator detent.

(2)Prepare the feedback unit (Ref. Fig. 405).

(a)Make sure the feedback unit is in the stow rig position.

1 Turn the input shaft of the feedback unit in the stow or deploy direction until the feedback unit is in the stow rig position.

2 Install a depth gage into the guide cable cap and turn the feedback drive shaft until you get a measurement between 0.710 and 0.770 in. (18.03 and 19.56 mm) (Ref. Fig. 405).

Make sure you can see only one stow rig line on the drive screw.

(3)Align the spline shaft on the feedback unit with the splines on the mount pad on the CDU and carefully install the feedback unit on the CDU.

(4)Install the three washers and bolts (1). TORQUE the three bolts (1) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN) (Ref. Fig. 403).

(5)Install the washer and bolt (2). TORQUE the bolt (2) to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

(6)Continue to TORQUE the bolts (1) to between 48 and 52 lbf.in. (0.54 and 0.59 m.daN). Continue to TORQUE the bolt (2) to between 114 and 126 lbf.in. (1.29 and 1.42 m.daN).

(7)After 10 minutes, TORQUE the bolts (1) again to between 48 and 52 lbf.in. (0.54 and 0.59 m.daN) and TORQUE the bolt (2) again to between 114 and 126 lbf.in. (1.29 and 1.42 m.daN).

WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES, AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIR FLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC, AND HIGHLY FLAMMABLE.

(8)Use a clean cloth wet with Material No.C04-001 or C04-004 to clean the mating flanges of the CDU and the feedback unit.

WARNING : THIS MATERIAL IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE PRIMER IN AN AREA WITH GOOD AIR FLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE MATERIAL ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.

(9)Apply Material No.C01-145 all around the interface of the CDU and the feedback unit to a thickness of approximately 0.0005 in. (0.013 mm) to seal the surface.

(10)Make certain that the stow "rig indicator" button is fully engaged in the stow position indicator detent of the CDU ballscrew. Also make certain that only one stow rig line is visible on the drivescrew of the Feedback Unit.

NOTE : The position of the indicator button can be seen through the rig inspection window.

(11)To manually release the CDU brake, put the brake at the detent angle of approximately 60 degrees (until a flat is felt) with the body of the CDU.

NOTE : At any other brake lever position the brake will be applied.

(12)Install a 0.25 in. (6.4 mm) square drive speed handle in one of the auxiliary drive pads. Hand crank the CDU to the full deploy position.

(13)Make certain that only one deploy rig line on the drivescrew is visible. If two rig lines or no rig lines are visible on the drivescrew, the Feedback Unit must be removed and rigged again to the CDU.

(14)Put the CDU in the full stow position. Make certain that only one stow rig line is visible on the drivescrew. If not, the Feedback Unit must be removed to make sure the rigging is correct.

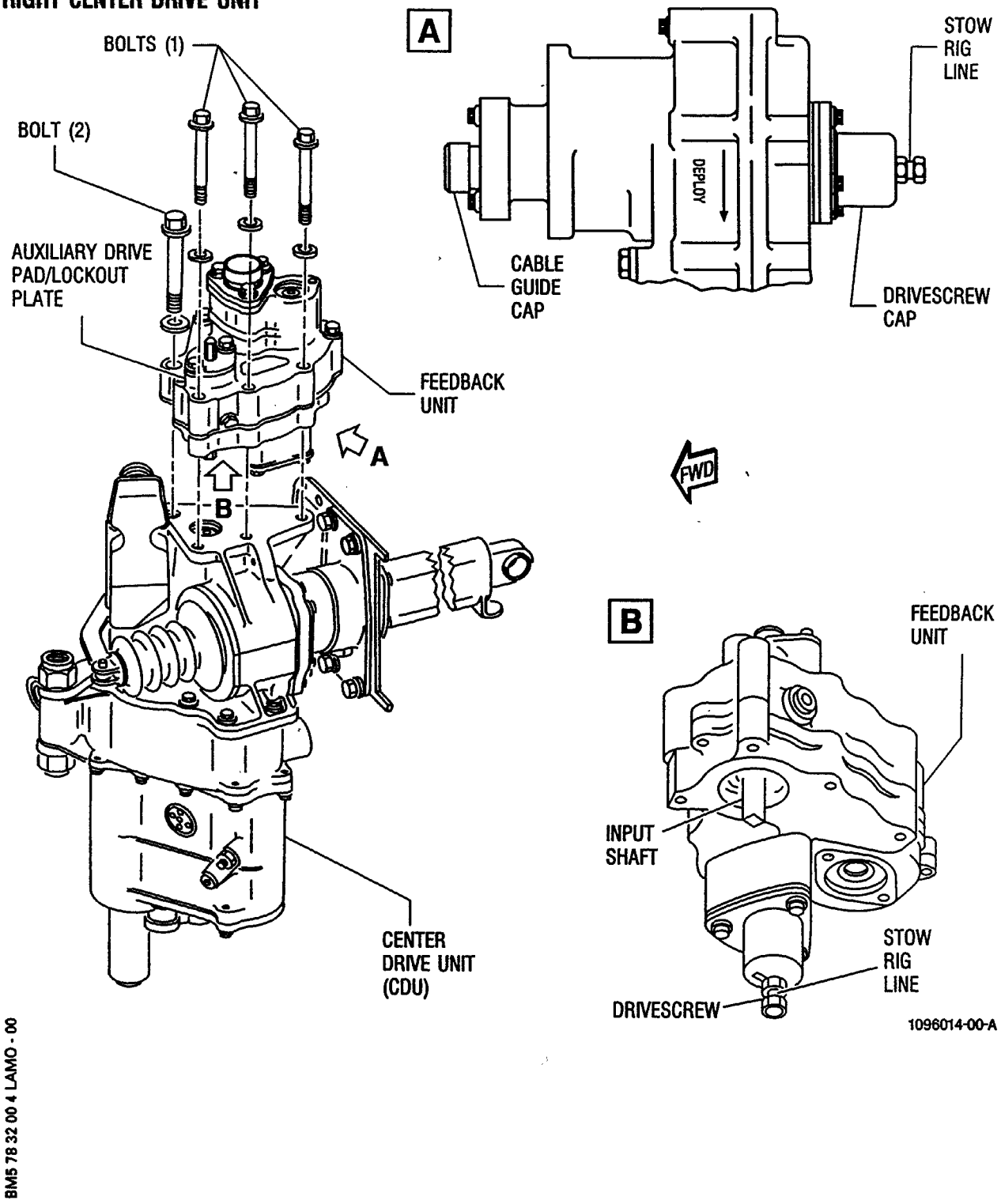
(15)Install the CDU (Ref. 78-31-01, P. Block 401).

D. Close-up

(1)Make certain that working area is clean and clear of tools and miscellaneous equipment items.

(2)Remove safety clips and tags and close circuit breakers.

RIGHT CENTER DRIVE UNIT



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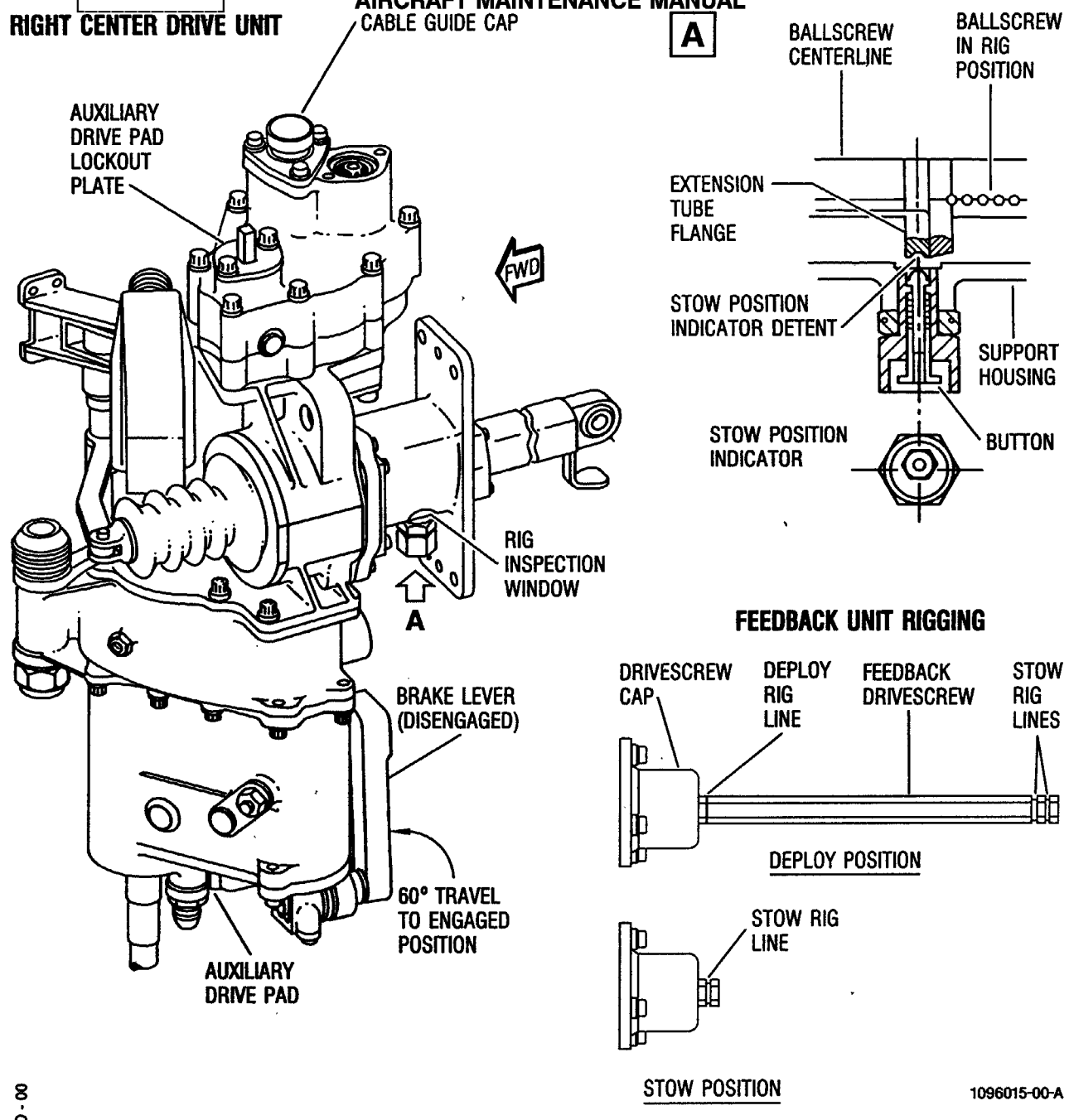
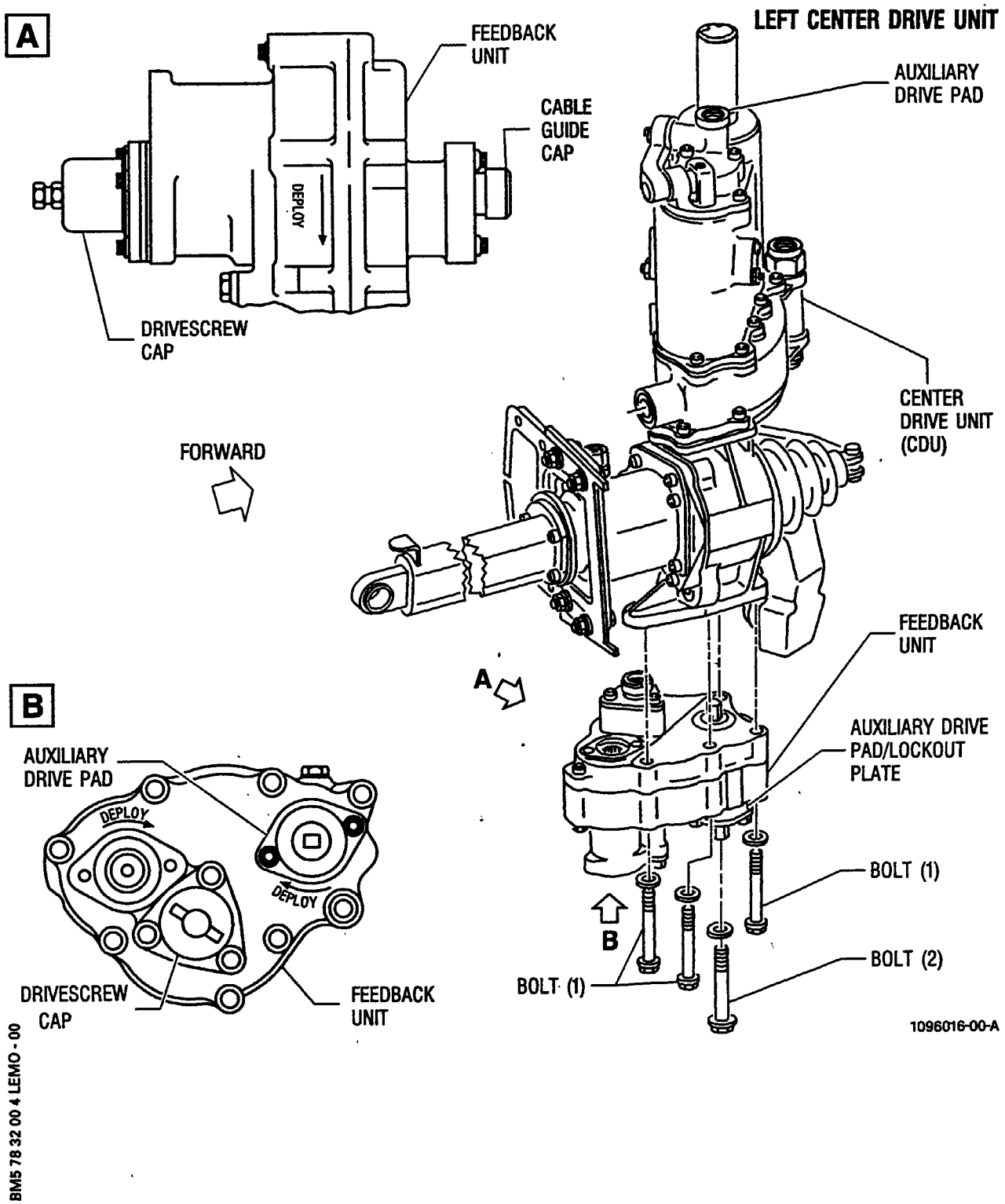
Feedback Unit Removal/Installation
Figure 401

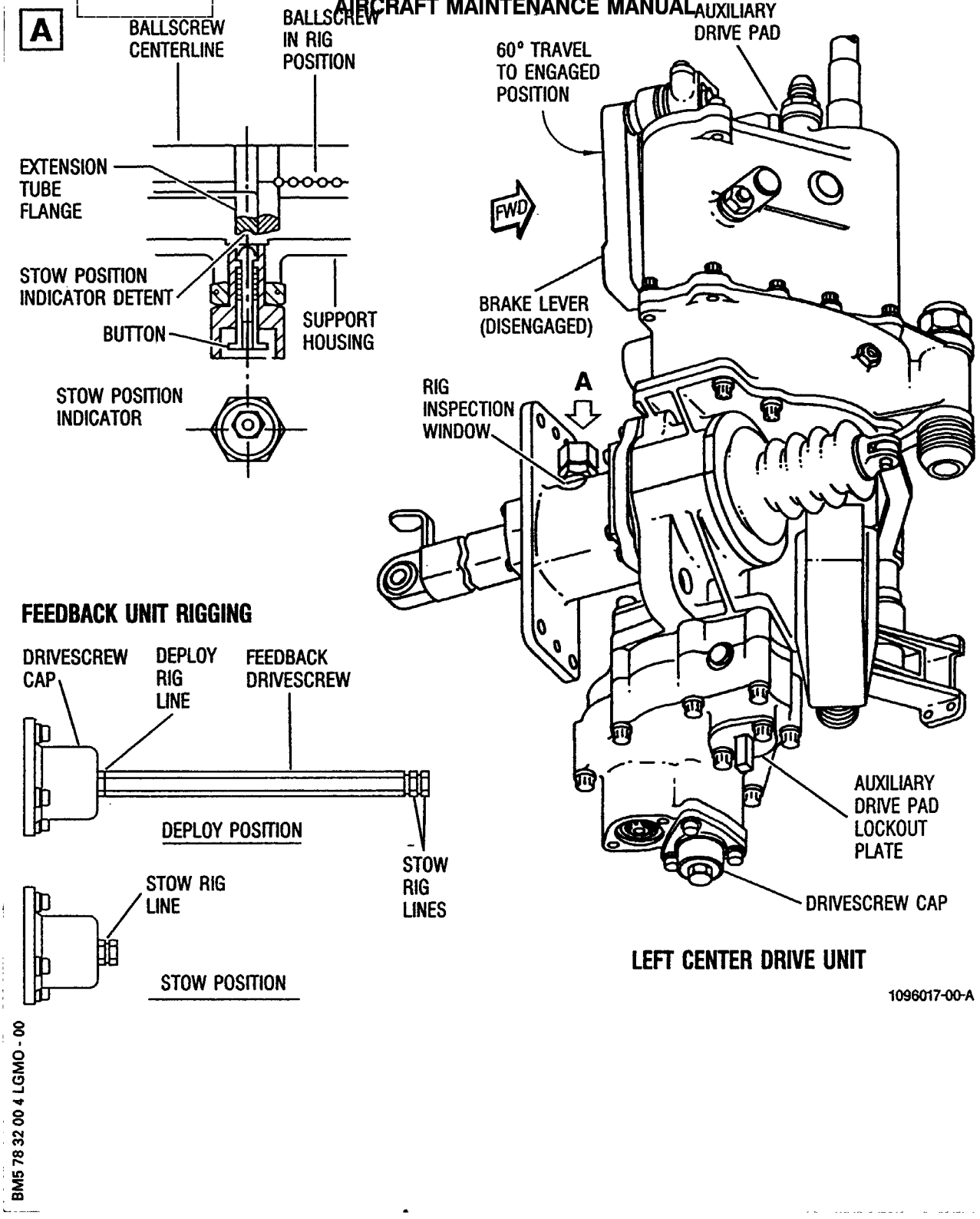


Feedback Unit Rigging
Figure 402

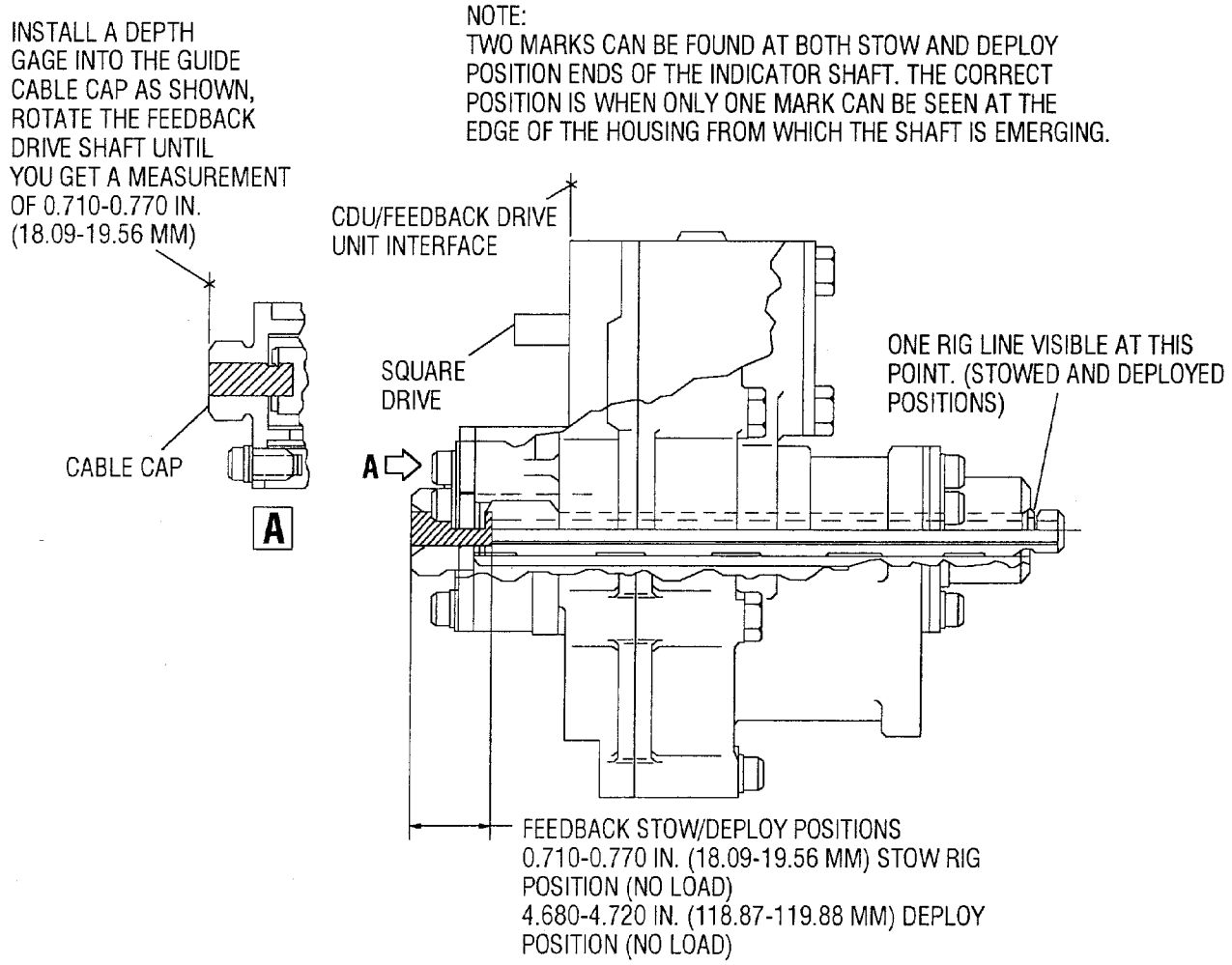


BM5 78 32 00 4 LEMO - 00

Feedback Unit Removal/Installation
Figure 403



Feedback Unit Rigging
Figure 404


INSTALL A DEPTH GAGE INTO THE GUIDE CABLE CAP AS SHOWN, ROTATE THE FEEDBACK DRIVE SHAFT UNTIL YOU GET A MEASUREMENT OF 0.710-0.770 IN. (18.09-19.56 MM)
CABLE CAP
A
NOTE:
TWO MARKS CAN BE FOUND AT BOTH STOW AND DEPLOY POSITION ENDS OF THE INDICATOR SHAFT. THE CORRECT POSITION IS WHEN ONLY ONE MARK CAN BE SEEN AT THE EDGE OF THE HOUSING FROM WHICH THE SHAFT IS EMERGING.
CDU/FEEDBACK DRIVE UNIT INTERFACE
SQUARE DRIVE
A
ONE RIG LINE VISIBLE AT THIS POINT. (STOWED AND DEPLOYED POSITIONS)
FEEDBACK STOW/DEPLOY POSITIONS
0.710-0.770 IN. (18.09-19.56 MM) STOW RIG POSITION (NO LOAD)
4.680-4.720 IN. (118.87-119.88 MM) DEPLOY POSITION (NO LOAD)

MR10112-00-A

BM5 78 32 00 4 LJM0 00

Feedback Unit Rigging
Figure 405

FAN REVERSER ASSEMBLY - INSPECTION/CHECK

1. General

This procedure pertains to the inspection and check of the fan reverser assembly.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No.C01-007	Adhesives, Plastics, Sealants (Ref. 70-00-00)
B. Material No.C01-011	Adhesives, Plastics, Sealants (Ref. 70-00-00)
C. Material No.C01-062	Adhesives, Plastics, Sealants (Ref. 70-00-00)
D. Material No.C01-106	Adhesives, Plastics, Sealants (Ref. 70-00-00)
E. Material No.C01-147	Adhesives, Plastics, Sealants (Ref. 70-00-00)
F. Material No.C01-155	Adhesives, Plastics, Sealants (Ref. 70-00-00)
G. Material No.C02-004	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
H. Material No.C02-018	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
I. Material No.C03-004	Finishes and Protective Coatings (Ref. 70-00-00)
J. Material No.C03-005	Finishes and Protective Coatings (Ref. 70-00-00)
K. Material No.C03-006	Finishes and Protective Coatings (Ref. 70-00-00)
L. Material No.C03-024	Finishes and Protective Coatings (Ref. 70-00-00)
M. Material No.C03-025	Finishes and Protective Coatings (Ref. 70-00-00)
N. Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
O. Material No.C04-003	Cleaning Compounds and Solvents (Ref. 70-00-00)
P. Material No.C04-035	Cleaning Compounds and Solvents (Ref. 70-00-00)
Q. Material No.C10-122	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-13-03, P. Block 401	Fan Thrust Reverser Cowl
- 78-31-00, P. Block 501	Thrust Reverser System Control
- 78-31-00, P. Block 901	Thrust Reverser System Control
- 78-32-11, P. Block 401	Fan Reverser Translating Cowl
R - 78-32-00, P. Block 801	Fan Reverser Assembly
- 78-32-12, P. Block 401	Fan Reserver Translating Cowl Blocker Door

ITEM	DESIGNATION
- 78-32-13, P. Block 401	Hinge Translating Cowl Inner Bondment Seal

3. Procedure

A. Job Set-Up
(1) Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2) Install access platform.
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.
(3) Manually release the center drive unit (CDU) brake (Ref. 78-31-00, P. Block 501).
(4) Remove the two bolts securing the lockout plate to the CDU and remove the plate.
(5) Install a 0.25 in. (6.35 mm) square drive speed handle into the auxiliary drive pad and manually drive the translating cowl toward deploy approximately 16 inches (406.4 mm).
(6) Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Visual Inspection/Check (Ref. Fig. 601, 602, 604)
(Ref. Fig. 603, 605, 606)
R (Ref. Fig. 607)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Translating Cowl for :		
(a) Cracks in honeycomb or sheet metal	Any number any length up to 2 in. (51 mm) maximum with a total accumulation of 12 in. (308 mm) separated by 2 in. (51 mm)	Stop drill cracks 0.5 in. (13 mm) or longer. Beyond limits, replace translating cowl (Ref. 78-32-11, P. Block 401)
(b) Holes in honeycomb	Any number up to 8 maximum separated by 1 in. (25 mm) with a maximum diameter of 1 in. (25 mm) one side only	Repair beyond limits (Ref. 78-32-00, P. Block 801). Replace translating cowl (Ref. 78-32-11, P. Block 401)
(c) Dents or buckles	Any number 0.256 in. (6.50 mm) deep	Replace translating cowl

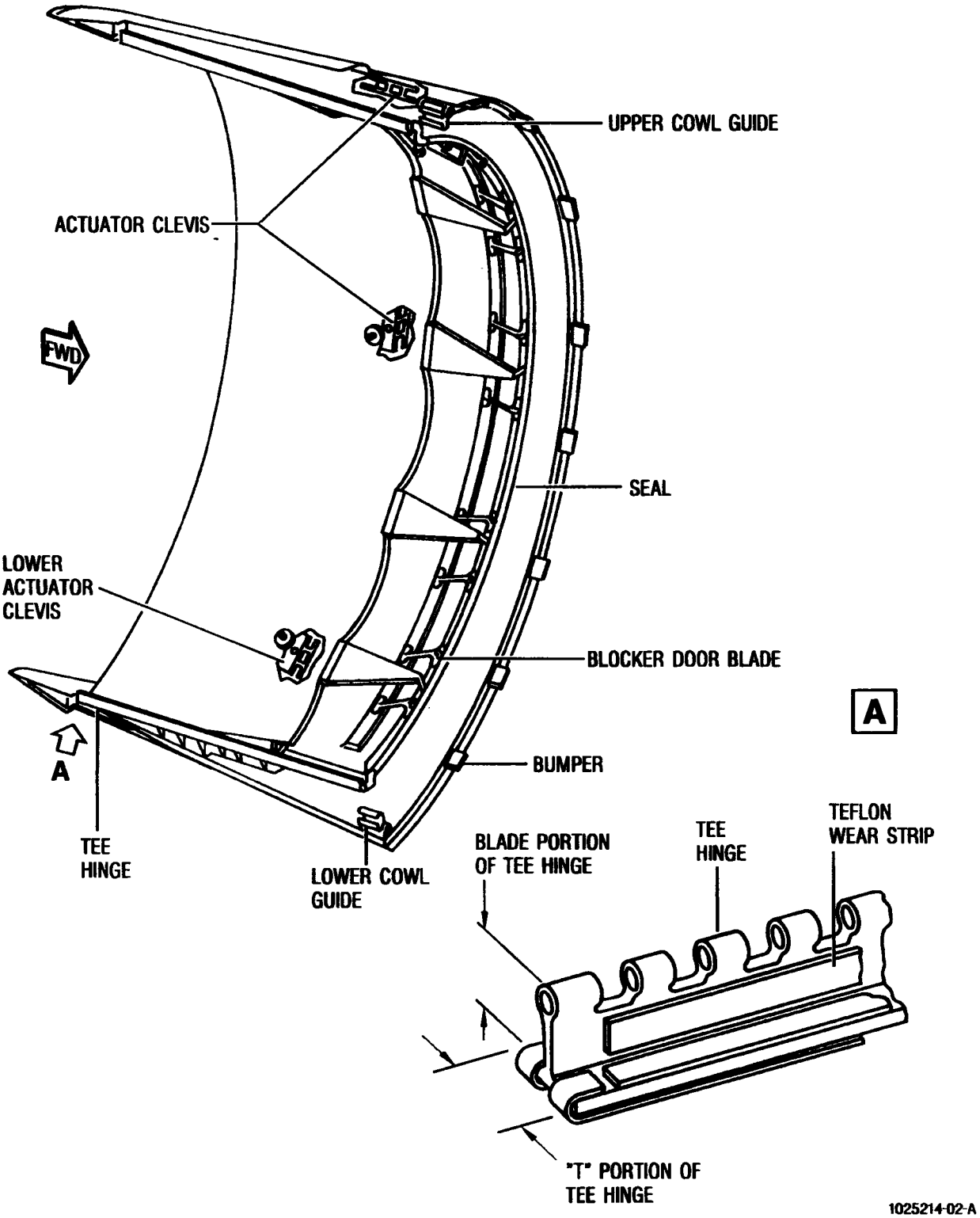
INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		(Ref. 78-32-11, P. Block 401)
(d) Wear of Teflon T-hinge blade	Any amount through Teflon extending into metal 0.030 in. (0.76 mm) maximum 2 in. (51 mm) in length maximum	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(e) Cracks in T-hinge lugs	2 consecutive lugs exclusive of end lugs, 4 total per assembly (hinge and blade)	replace translating cowl (Ref. 78-32-11, P. Block 401)
(f) T portion of T-hinge for wear	Any amount 0.025 in. (0.64 mm) deep	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(g) Bumpers for wear	Any amount 0.06 in. (1.52 mm) deep	Replace bumper (Ref. 78-31-00, P. Block 501)
(h) Bumpers for cracks	Not serviceable	Replace bumper (Ref. 78-31-00, P. Block 501)
(i) Radial clearance of lock bumper assembly with support assembly	0.020 in. (0.51 mm) minimum gap must exist between outer side of bumper and support assembly with cowl in stowed position	Shim bumper as required to achieve gap (Ref. 78-31-00, P. Block 501)
(j) Cracks in blocker door clevis	Not serviceable	Replace clevis per Approved Repair X
(k) Missing rivets	Any amount up to 11 percent with missing rivet separated by 4 good rivets. No end rivets allowed to be missing	Replace rivets
(l) Bulb seal damage :		
1 Radial cuts/splits/tears	Up to 5 cuts over length of seal	Over 5 cuts, replace seal (Ref. 78-32-13,

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		P. Block 401)
2 Circumferential cuts/splits/tears	At vent holes, any amount of tears through fabric up to 0.5 in. (12.7 mm) in length All areas between vent holes, no amount	Over limits, replace seal (Ref. 78-32-13, P. Block 401) Replace seal (Ref. 78-32-13, P. Block 401)
3 Nicks (not through seal)	Maximum of 0.25 in. (6.35 mm) length or width, separated by 5 in. (12.7 cm) circumferentially	Over limits, replace seal (Ref. 78-32-13, P. Block 401)
4 Punctures/pin holes (through seal)	Maximum of 0.03 in. (0.76 mm) diameter, separated by 10 in. (25.4 cm) circumferentially	Over limits, replace seal (Ref. 78-32-13, P. Block 401)
5 Missing sections	Not serviceable	Replace seal (Ref. 78-32-13, P. Block 401)
(m) Delamination of outer bondment	Unbonded area not to exceed 16 sq.in. (103 cm^2) each occurrence	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(n) Delamination of aft outer bondment (area D) See corresponding figure.	Not serviceable	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(o) Delamination of aft outer bondment (area C) See correponding figure.	Not serviceable	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(p) Delamination of and/or wire	Any amount up to 18.3 sq.ft. (1.70 m^2), including	If the damage is less than or equal to

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
mesh screen that is gone.	blocker doors, for a full reverser (two halves).	the limits, repair the wire mesh (Ref. 78-32-00, P. Block 801). If the damage is more than the limits, replace translating cowl (Ref. 78-32-11, P. Block 401)
(q) Delamination of all other areas aft outer bondment	Not serviceable	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(r) Delamination of forward inner bond-ment	Not serviceable	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(s) Rigging	0.06 to 0.150 in. (1.50-3.80 mm) gap between support and cowl at center section	Rig (Ref. 78-31-00, P. Block 501)
(t) Security of upper and lower cowl guide bracket	No rivets or bolts gone. No cracks in bracket or skin permitted.	Replace translating cowl (Ref. 78-32-11, P. Block 401)
(u) Looseness of blocker door hinge blade bearings by attempting to move door radially and axially	Relative motion should be less than 0.005 in. (0.13 mm) total along any line	Replace blocker door hinge blade (Ref. 78-32-12, P. Block 401)
(v) Paint crazing at the filler material joints	Any amount	Repair (Ref. 78-32-00, P. Block 801).
(w) Cracks in the actuator access panel	Up to four cracks, with a maximum of 2.0 in. (50.8 mm) for the total length of all cracks.	If within the serviceable limits, no repair is necessary. If not

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	Minimum distance from other damage must be 2.0 in. (50.8 mm)	within the serviceable limits, repair cracks in the actuator access panel with Material No.C01-011 NOTE : Cracks in the actuator access panel can occur if the installation screws are torqued to more than 22 - 27 lb in. (0.24 - 0.30 m.daN).
(x) Missing face sheet	None permitted	For Martin Marietta translating cowls (P/N begins with 491B) only: A maximum of two areas for each translating cowl half, each with a maximum area of 300 sq.in. (1935.5 sq.cm) separated by a minimum of 12.0 in (30.5 cm) are permitted if a temporary repair is done as follows: Bond two plies of Material No.C10-122 over the whole damaged area with Material No.C01-011 or Material No.C01-155 and cure for 1 hour at 200°-220°F (93°-104°C) or at room temperature for 24 hours. The repair material must make a minimum overlap of 0.5 in. (12.7 mm) on the perforated skin. This temporary repair makes the

	INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
			aircraft serviceable for 6 months. If the damage increases to more than the repairable limits, replace the translating cowl (Ref. 78-32-11, P. Block 401).
	Pre MRAS SB 78-1089		
	(y) Gap between the longeron stud and the aft cascade the aft cascade (deflector) ring at the actuator clevis fitting	The minimum gap permitted is 0.060 in. (1.52 mm) (1.52 mm)	Replace the longeron stud (Ref. 78-32-00, P. Block 801) P. Block 801)
	End Pre MRAS SB 78-1089		
R	(z) Damage to the trailing edge of the translating cowl due to physical contact or lightning strike (area E)(see NOTE 1)	Not serviceable	For damage up to 0.30 in. (7.6 mm) deep (fwd/aft) by 12.0 in. (304.8 mm) long (hoop), blend the trailing edge to the dimensions shown (see NOTE 1). For damage up to 4.0 in. (101.6 mm) deep (fwd/aft) by 8.0 in. (203.2 mm) long (hoop), repair the damage (Ref. 78-32-00, P. Block 801). A maximum of two damage areas, a minimum of 6.0 in. (152.4 mm) apart, are permitted on a reverser half. If the damage is more than the limits, replace the translating cowl (Ref. 78-32-11, P. Block 401).



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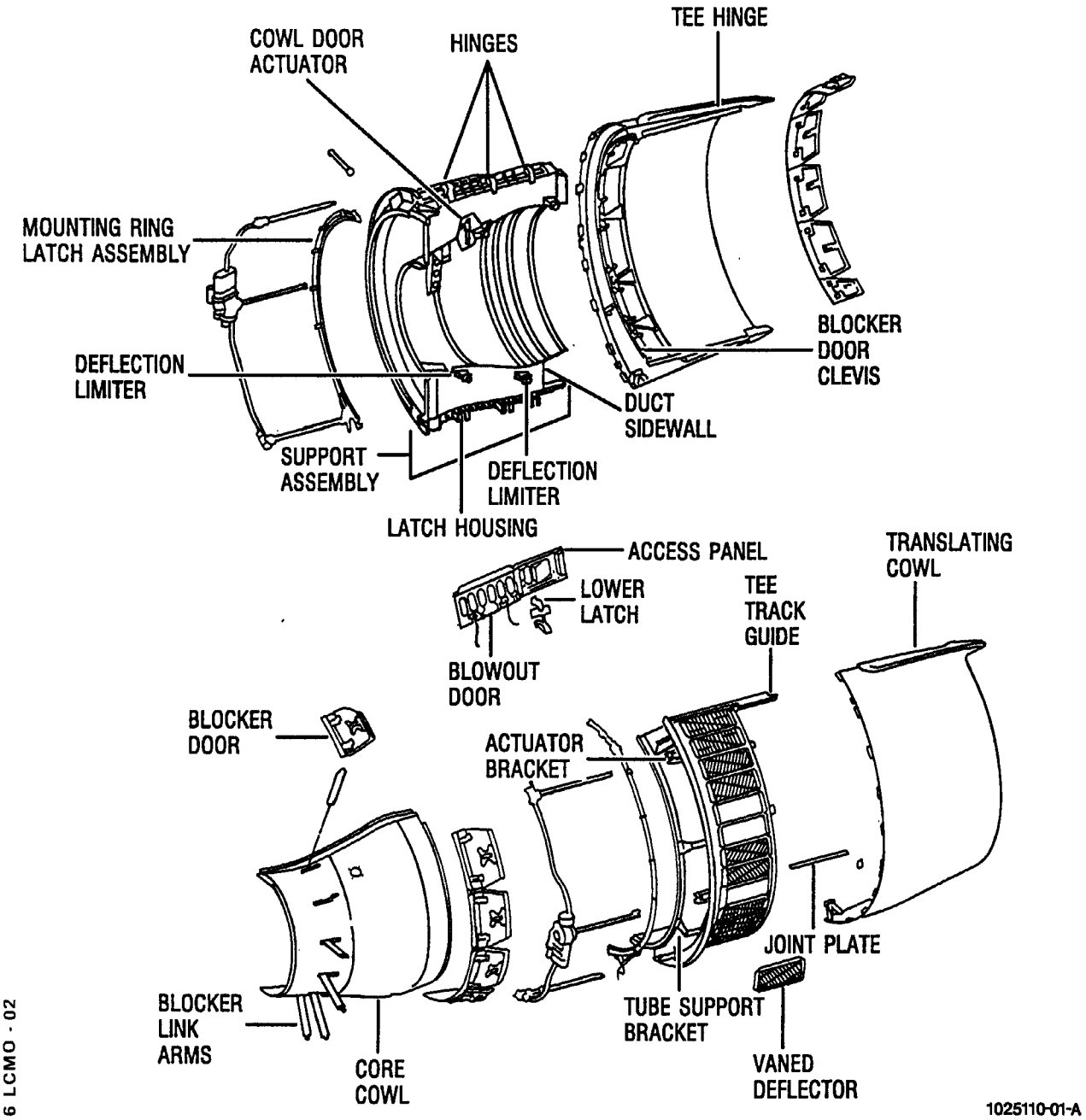
Translating Cowl Inspection Areas
Figure 601



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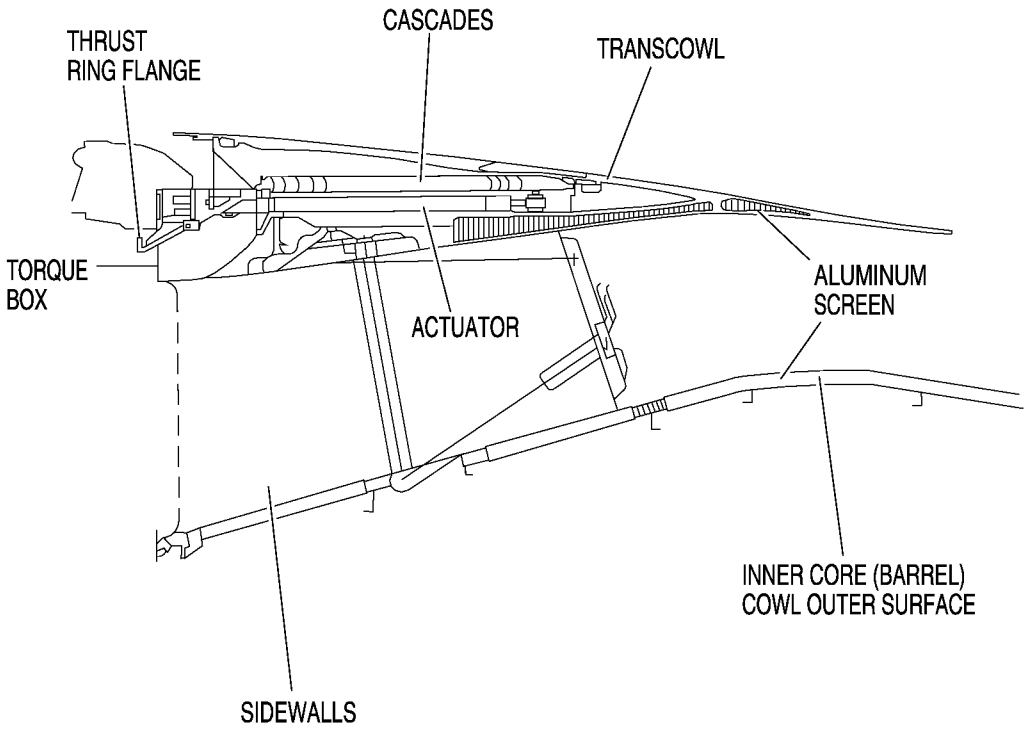
Fan Reverser Components
Figure 602



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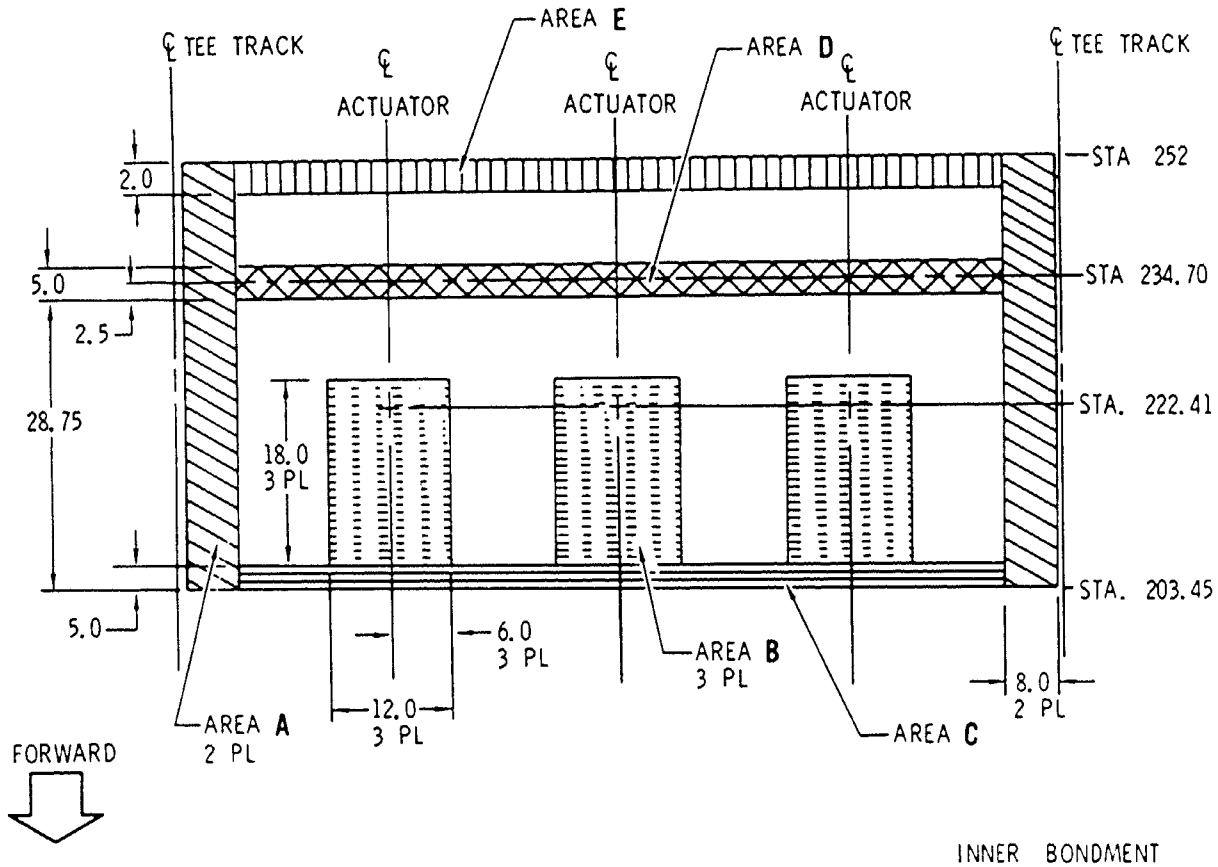
Fan Reverser Components
Figure 603

R



INNER BONDMENT
FLAT ROLLOUT
LOOKING INBD.

AREA

A TRANSCOWL HINGE LINE
B ACTUATOR LONGERON AREA
C HINGE CLEVIS & FWD. SEAL ATTACHMENT
D MATE LINE FASTENERS
E TRAILING EDGE DOUBLER (NOZZLE EXIT)

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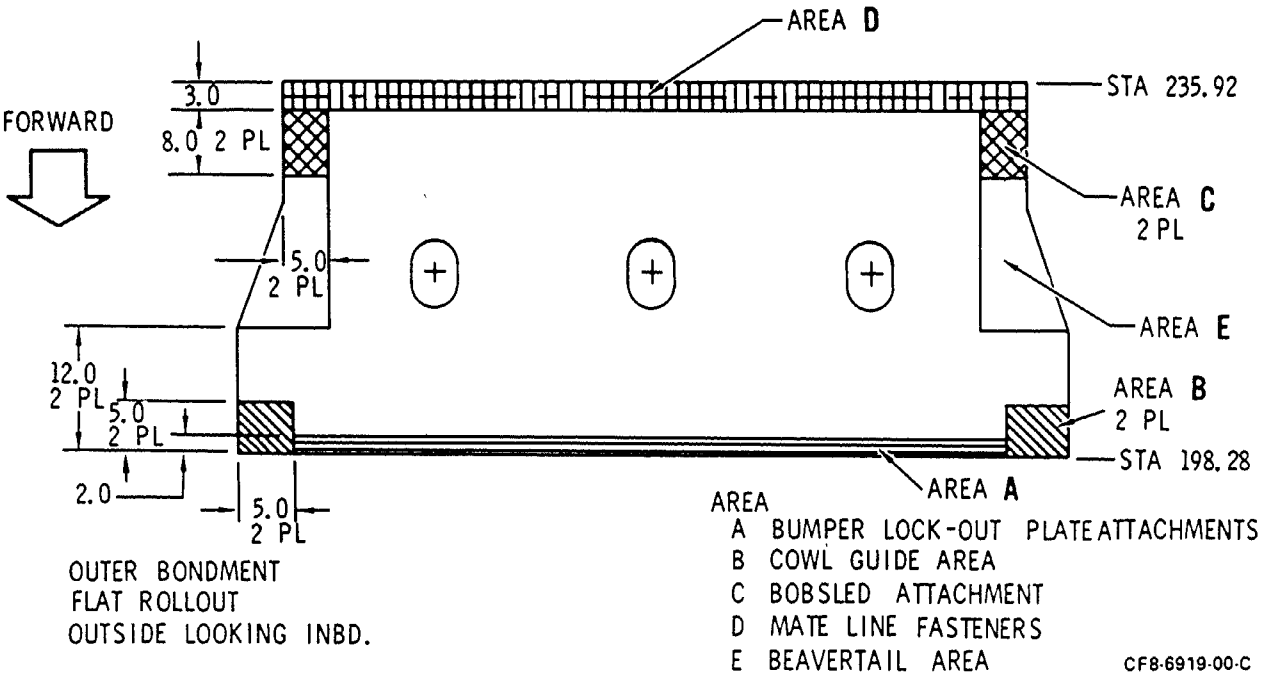
Translating Cowl - Inner/Outer Bondments (Sheet 1/2)
Figure 604

R



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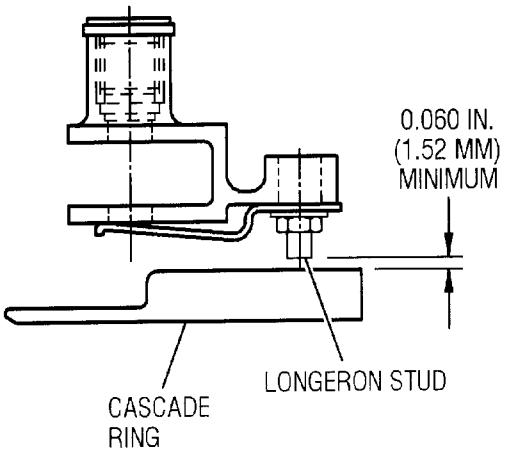
R Translating Cowl - Inner/Outer Bondments (Sheet 2/2)
Figure 604



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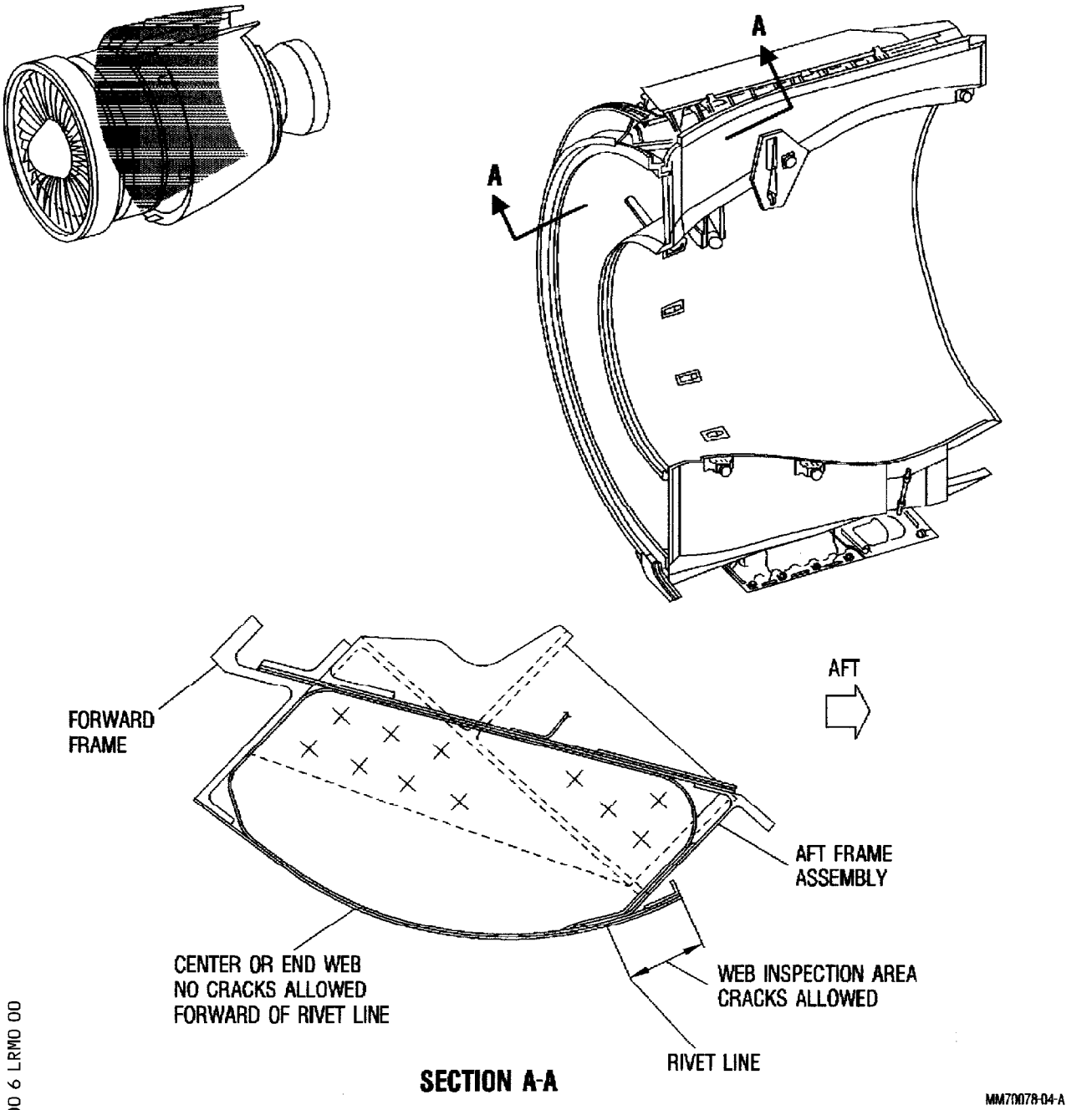
Longeron Stud Check (Pre MRAS SB 78-1089)
Figure 605



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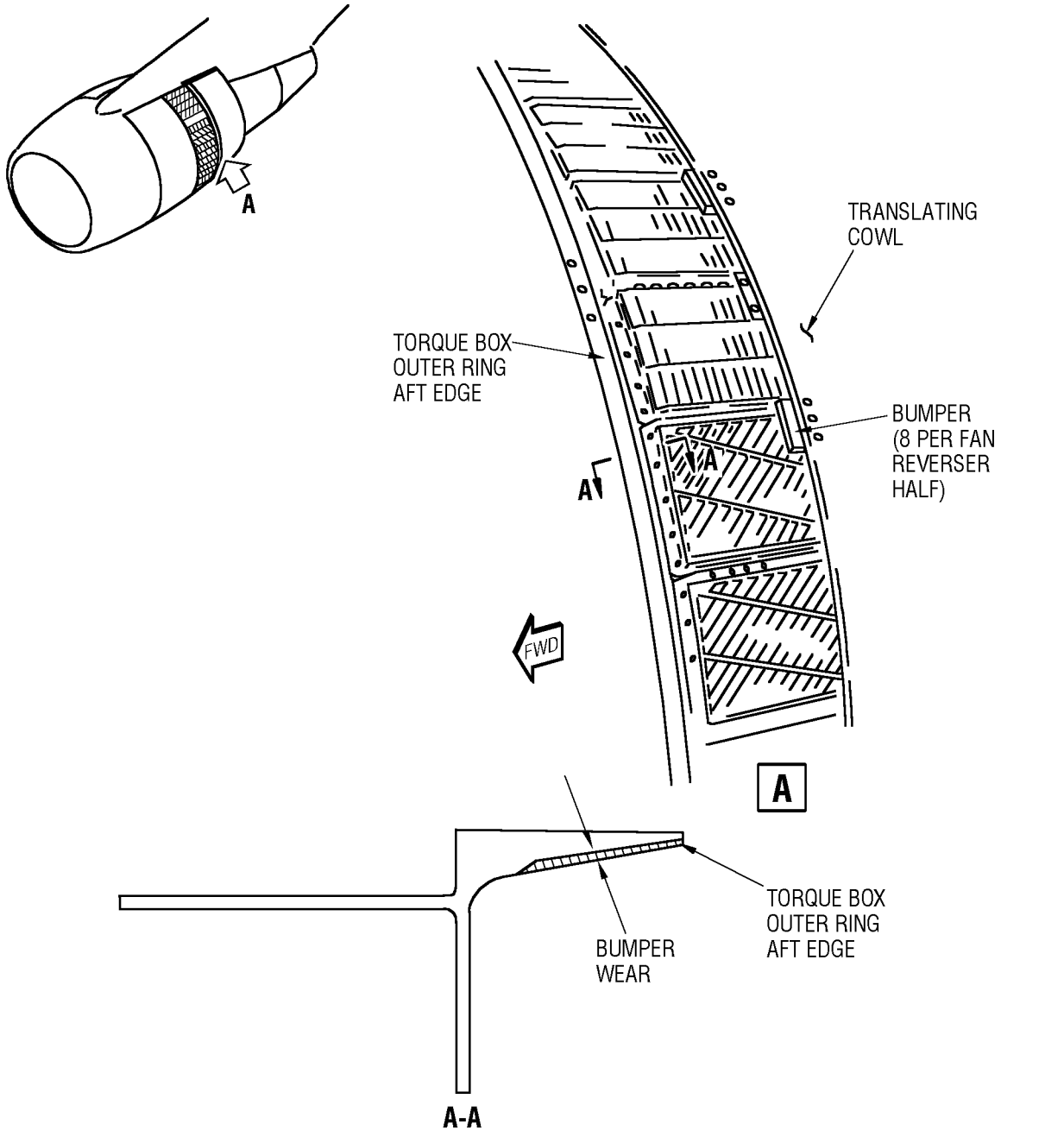
Forward (Dagmar) Fairing Inspection
Figure 606



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Thrust Reverser - Torque Box Outer Ring
Figure 607

R NOTE 1 : (Ref. Fig. 608)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(2) Forward (Dagmar) Fairing for :		
(a) Rub marks	Any amount up to 0.010 in. (0.254 mm)	Blend rub marks as necessary, and apply Material No.C03-006. Beyond the limits, replace the forward fairing
(b) Dents	Any amount up to 0.060 in. (1.524 mm)	No repair is necessary
	0.061-0.120 in. (1.549-3.048 mm)	Remove the dent with a dent puller, and apply Material No.C03-006. Beyond the limits, replace the forward fairing
(c) Cracks aft of the rivet line, but not within 0.25 in. (6.35 mm) of a rivet in the rivet line	Any number of cracks are permitted, with each crack up to 2.0 in. (50.8 mm) in length, and a total length of all cracks less than 12.0 in. (304.8 mm) and a minimum distance of 2.0 in. (50.8 mm) between the cracks.	Stop-drill the crack, and fill with Material No.C01-007.
Cracks within 0.25 in. (6.35 mm) of a rivet in the rivet line	Not serviceable	Replace the web or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).
Cracks forward of the rivet line	Not serviceable	Replace the web or deactivate the thrust reverser (Ref. 78-31-00, P. Block 901).
Cracks longer than 2.0 in. (50.8 mm)	Not serviceable	Replace the web or deactivate the thrust reverser (Ref. 78-31-00,

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		P. Block 901).
(d) Holes	Four holes or less, with a maximum diameter of 0.10 in. (2.54 mm). There must be a minimum distance of 1.00 in. (25.4 mm) between the holes	No repair is necessary. If there are five or more holes, replace the forward fairing
(e) Loose fasteners	Not serviceable	Replace the loose fasteners
(3) Support Assembly for :		
(a) Cracks in Honeycomb or sheet metal	Any number, any length up to 2 in. (50.8 mm) maximum with a total accumulation of 12 in. (308.4 mm) separated by 2 in. (50.8 mm)	Stop drill cracks 0.5 in. (12.7 mm) or longer. Beyond limits, replace reverser half per (Ref. 71-13-03, P. Block 401)
(b) Missing wire mesh (delamination)	Any amount up to 18.3 sq.ft. (1.70 m^2) for a full reverser (two halves) NOTE: Do not include screenless core cowls P/N 491B1340000-069 and up (left side) or screenless core cowls P/N 491B1340000-020 and up (right side) in the missing wire mesh inspection or calculation	If the damage is less than or equal to the limits, repair the wire mesh (Ref. 78-32-00, P. Block 801). If the damage is more than the limits, replace translating cowl (Ref. 78-32-11, P. Block 401)
(c) Holes in honeycomb	Any number up to 8 maximum separated by 1 in. (25.4 mm) with a maximum diameter of 1 in. (25.4 mm) one side only	Repair (Ref. 78-32-00, P. Block 801) Beyond limits, Replace translating cowl (Ref. 78-32-11, P. Block 401)
(d) Delamination of core cowl	Not serviceable	Replace reverser half

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
inner skin		(Ref. 71-13-03, P. Block 401)
(e) Cracks at forward flange bolt holes	One crack per hole, 4 holes maximum and separated by one good hole	Replace reverser half (Ref. 71-13-03, P. Block 401)
(f) Cracks in forward flange	Any number, any length up to 0.5 in. (12.7 mm) maximum with a total accumulation of 4 in. (101.6 mm) separated by 1 in. (25.4 mm)	Replace reverser half (Ref. 71-13-03, P. Block 401)
(g) Distortion of forward flange	None allowed	Replace reverser half (Ref. 71-13-03, P. Block 401)
(h) Dents in honeycomb	No maximum limit if not more than 0.125 in. (3.18 mm) deep.	Repair dents
(i) Buckles in honeycomb	Not permitted	Repair buckles
(j) Torn and/or missing seals	Sealing surface must have an affect at least 90 percent	Replace seal or repair with Material No.C01-007 (RTV 106)
(k) Cracks in precooler duct	Not permitted in seal leaf springs. Other areas, 1 in. (25.4 mm) maximum length with a total accumulation of 4 in. (10.16 cm) separated by 1 in. (25.4 mm)	Replace the precooler duct (Ref. 78-32-00, P. Block 801)
(l) Precooler bellows for tears, holes, etc.	Tears and/or holes less than 1.0 sq in. (6 sq. cm^2)	Repair areas with (C01-007). Areas larger, replace boot
(m) Missing rivets	No maximum limit if not more than 10 percent with missing rivet se-	Replace rivets

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	parated by 4 good rivets. No end rivets can be missing	
(n) Wear of engine cowl strip	No maximum limit if not more than 0.030 in. (08. mm) deep maximum	Replace reverser (Ref. 71-13-03, P. Block 401)
(o) Support structure core cowl, sidewall or precooler duct MA25S coating for peeling, cracking, chipping and/or missing (See NOTE 2)	Maximum area of 1 sq.in. (6.45 sq.cm) or area not more than an average width of 1/4 in. (6.4 mm) length of 12 in. (304.8 mm). Maximum of 15 areas in each reverser half, maximum of 3 areas in a 1 sq.foot (929.0 sq.cm) area	Areas less than 4 sq. in. (26 sq.cm) and/ or area not more than an average width of 1 in. (25 mm) or total length of 12 in. (304.8 mm) to be repaired with silicone rubber RTV 106 (C01-007). Total area must not be more than 200 sq.in. (1290.3 sq.cm) in each reverser half
(p) Chipped and/ or missing paint	No maximum limit	Touch up with Alodine 1200 (C03-006)
(q) Loose brackets	Not serviceable	Tighten fasteners or replace brackets (Ref. 78-32-00, P. Block 801)
(r) Deflection limiter brackets deformed, bent, and/or buckled	No maximum limit if contact exists between limiter and mating surfaces	Re-form or replace bracket (Ref. 78-32-00, P. Block 801)
(s) Cracks in upper hinges and lower latch housings	Not serviceable	Replace reverser half (Ref. 71-13-03, P. Block 401)
(t) Wear in upper hinges and lower	Maximum of 0.03 in. (0.8 mm)	Replace reverser half (Ref. 71-13-03,

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
latch housings		P. Block 401)
(u) Dents and/or rub marks in core cowl from contact with blocker doors	Rubs, permitted if not more than (0.020 in. (0.51 mm) deep. Dents, permitted if not more than 0.125 in. (3.2 mm) deep	Replace reverser half. If damage is less than limits, trim blocker door to give a 0.20-0.30 in. (5.1-7.6 mm) clearance and apply corrosion protection coating to cowl
(v) Pulled and/or missing bolts in precooler duct	Not serviceable	Repair (Ref. 78-32-00, P. Block 801)
(w) Delamination of lower sidewal	No maximum limit if not more than 10 in. (254 mm) long	Replace reverser (Ref. 71-13-03, P. Block 401)
(x) Delamination of upper sidewall	No maximum limit if not more than 30 sq.in. (194 cm^2) undoubled areas. Not permitted in double areas adjacents to hinges and actuator mount bracket	Replace reverser (Ref. 71-13-03, P. Block 401)
(y) Wear of the torque box outer ring where the translating cowl bumpers contact.	Maximum depth 0.050 in. (1.3 mm).	If wear is beyond limits, repair with a doubler (Ref. 78-32-00, P. Block 801). If wear is within limits, blend and apply Material No.C03-006. If necessary, doubler repair can be completed to prevent additional wear.
(z) Upper or lower duct sidewall fire seals that are torn or missing	Not serviceable	Replace seals with missing segments. Repair torn seals with silicone rubber

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		sealant RTV 106 (Material No. C01-007)
(aa) Other seals that are not upper or lower duct sidewall fire seals	90 percent contact area	Replace seals with missing segments. Repair torn seals with silicone rubber sealant RTV 106 (Material No. C01-007)
R NOTE 2 : (Ref. Fig. 609)		
(4) Lower Latches for :		
(a) Housing cracks	Not serviceable	Replace reverser (Ref. 71-13-03, P. Block 401)
(b) Sheet metal crack gusseting	Maximum of 1.0 in. (25.4 mm)	Replace reverser (Ref. 71-13-03, P. Block 401)
(c) Fretting on latch hook contact areas	No maximum limit if it cannot be felt with a 0.030 in. (0.8 mm) scribe	Replace latch (Ref. 78-32-00, P. Block 801)
(d) Absence of lubricant in hook contact areas	Not serviceable if metal visible through coating	Lubricate with Material No.C02-004
(e) Fretting of latch pins	No maximum limit if it cannot be felt with a 0.030 in. (0.8 mm) scribe	Replace pin (Ref. 78-32-00, P. Block 801)
(f) Wear of latch pins	Forward and mid latch mounting pin - any amount 0.002 in. (0.05 mm) with a 0.495 in. (12.6 mm) minimum diameter	Replace pin (Ref. 78-32-00, P. Block 801)
	Forward and mid latch hook pin - any amount 0.002 in. (0.05. mm) with a 0.559 in. (14.2	Replace pin (Ref. 78-32-00, P. Block 801)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	mm) minimum diameter	
	Both aft latch pins - any amount 0.002 in. (0.05 mm) with a 0.434 in. (11.0 mm) minimum diameter	Replace pin (Ref. 78-32-00, P. Block 801)
(5) Mounting Ring Latch Assembly for :		
(a) Cracks on latch	Not serviceable	Replace latch (Ref. 78-32-00, P. Block 801)
(b) Damaged cable and cable housing	Not serviceable	Replace cable
(c) Cracks in flange	Any number any length up to 0.5 in. (12.7 mm) maximum with a total accumulation of 2 in. (50.8 mm) separated by 1 in. (25.4 mm)	Replace latch assembly (Ref. 78-32-00, P. Block 801)
(d) Cracks at bolt holes	One per hole with a maximum length of 0.5 in. (12.7 mm). Cracked holes to be separated by one good hole	Replace latch assembly (Ref. 78-32-00, P. Block 801)
(e) Bent, cracked, broken, or missing mounting ring or lower latch pins	Not serviceable	Replace pin (Ref. 78-32-00, P. Block 801)
(f) Fretting in contact area between lower latch hook and hinge bolt	Any amount that cannot be felt with a 0.030 in. (0.8 mm) radius scribe	Replace latch assembly (Ref. 78-32-00, P. Block 801)
(g) Binding in the upper latch mechanism	No more than 15 lbf. of closing force (6.67 daN) for the upper latch	Over the serviceable limits, clean the upper latch hook

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	handle. Make the measurement 1 in. (25.4 mm) from the end of the latch handle	mechanism and the upper latch handle assembly with Material No.C04-001, Material No.C04-003, or Material No.C04-035, then lubricate with Material No.C02-018. No lubricant is permitted in the cable assembly or latch interface areas. If, after cleaning and lubrication, the measured force stays over the serviceable limits, replace the latch ring assembly
(h)Grease or other unwanted material on the latch ring/ V-groove interface surface	Not permitted	Clean the interface surface with Material No.C04-001, Material No.C04-003 or Material No.C04-035
(i)Looseness of the bolts that attach the mounting ring latch assembly to the torque box forward frame flange	Not permitted	TORQUE the self-locking nuts to between 50 and 70 lbf.in. (0.57 and 0.79 m.daN)
(j)Deformation, cracks, or missing pieces on the upper latch cam (see NOTE 1) NOTE : Some early configurations of the forward upper latch assembly do not have an upper latch cam	Not permitted	If there is deformation, make the upper latch cam straight or replace as necessary. If there are cracks or missing pieces, replace the latch cam
(k)Wear or looseness of the forward upper latch assembly	Not permitted	Replace the worn links, bushings, spacers, and/or

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
		internal cam as necessary
(l) Deformation of the horizontal flange of the stop bracket on the U-bolt assembly on the engine fan case (see NOTE 2) NOTE : Some early configurations of the U-bolt assembly do not have a stop bracket NOTE 1 : (Ref. Fig. 610) NOTE 2 : (Ref. Fig. 611)	Not permitted	Make the flange straight or replace the stop bracket

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(6) Actuator Mount Brackets for :		
(a) Cracks	Not serviceable	Replace bracket (Ref. 78-32-00, P. Block 801)
(b) Bends or dents	Bends any amount provided no interference is encountered. Dents any amount up to 0.250 in. (6.4 mm) deep	Replace bracket (Ref. 78-32-00, P. Block 801)
(c) Missing rivets where vertical bracket mounts to vertical bulkhead	Not serviceable	Replace bracket (Ref. 78-32-00, P. Block 801)
(d) Torn metal where bracket mounts to vertical bulkhead	Not serviceable	Replace bracket (Ref. 78-32-00, P. Block 801)
(e) Cracks in actuator clevis	Not serviceable	Replace bracket (Ref. 78-32-00, P. Block 801)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(7) Vaned Deflectors (Cascades) for :		
(a) Cracks in the leading or trailing edge of the deflector's vanes	A maximum length of 0.25 in. (6.4 mm) is permitted for each crack. A maximum of 5 cracks on each deflector vane is permitted. Cracks on the leading edge must not be aligned with cracks on the trailing edge	If out of the serviceable limits, replace the deflector (Ref. 78-32-00, P. Block 801)
(b) Broken vanes or vanes that are gone	A maximum 3 vanes in a deflector can be broken or gone, if each damaged vane is between two good vanes	If out of the serviceable limits, replace the deflector (Ref. 78-32-00, P. Block 801)
(c) Dents on the leading or trailing edge of the deflector's vanes	Any number of dents permitted. Maximum depth permitted for each dent is 0.12 in. (3.1 mm)	If out of the serviceable limits, replace the deflector (Ref. 78-32-00, P. Block 801)
(d) Cracks at the mounting bolt holes	One crack, up to 0.5 in. (12.7 mm) in length is permitted for each bolt hole. One crack on each side of the deflector is permitted (maximum of 4 cracks on each deflector)	If out of the serviceable limits, replace the deflector (Ref. 78-32-00, P. Block 801)
(e) Loose bolts or bolts that are gone	Not serviceable	Replace the bolts that are gone. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN)
(8)Blank Deflectors (Cascades) for:		
(a) Cracks in the part of the blank plate that makes an S-shaped bend next to the axial row of bolt holes	Not serviceable	Replace the deflector (Ref. 78-32-00, P. Block 801)

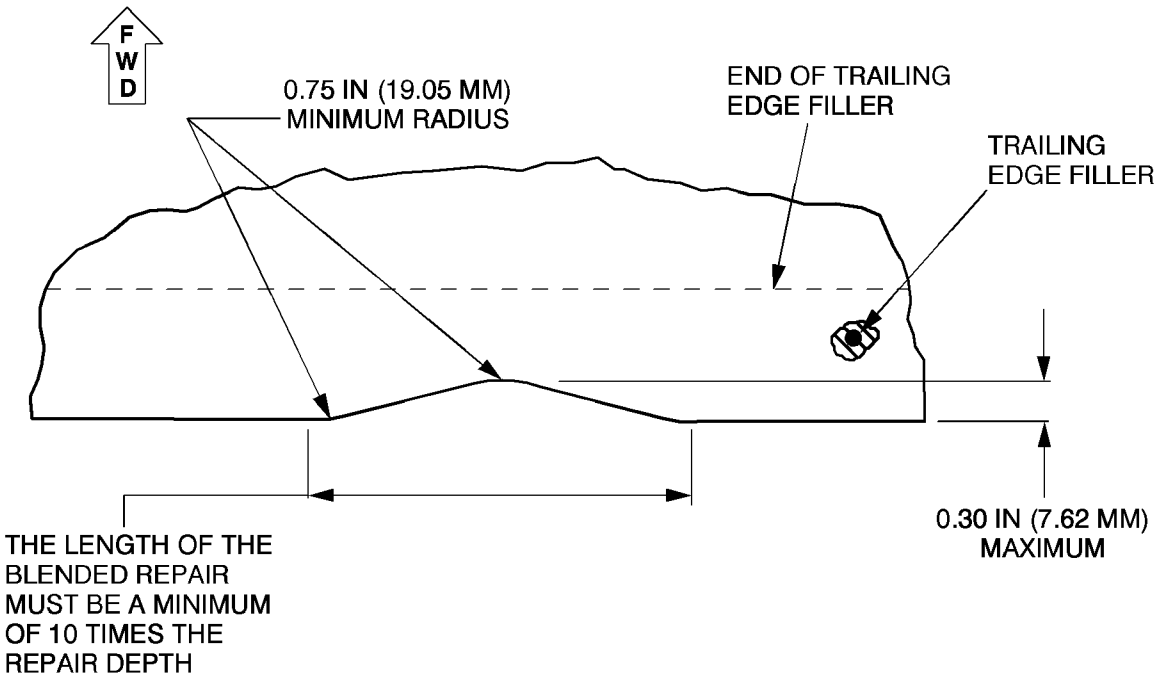
INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(b) Cracks at the mounting bolt holes	One crack, up to 0.5 in. (12.7 mm) in length is permitted for each bolt hole. One crack on each side of the deflector is permitted (maximum of 4 cracks on each deflector)	If out of the serviceable limits, replace the deflector (Ref. 78-32-00, P. Block 801).
(c) Dents	Any number of dents permitted. Maximum depth permitted for each dent is 0.12 in. (3.1 mm)	If out of the serviceable limits, replace the deflector (Ref. 78-32-00, P. Block 801).
(d) Doublers that are gone, broken, or not fully bonded along each row of mounting bolt holes	Not serviceable	Replace the deflector (Ref. 78-32-00, P. Block 801)
(e) Loose bolts or bolts that are gone	Not serviceable	Replace the bolts that are gone. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN)
(9) Deflector Beams for :		
(a) Cracks	None allowed	Replace beam (Ref. 78-32-00, P. Block 801)
(b) Wear	Any amount up to 0.025 in. (0.06 mm)	Replace beam (Ref. 78-32-00, P. Block 801)
(10)Blocker Doors for :		
(a) Cracks	None allowed in mounting area. Outside mounting areas, any number any length up to 1 in. (25 mm) with a total accumulation of 4 in. (102 mm) per door	Replace door (Ref. 78-32-00, P. Block 801) Refer to Over Serviceable Limit Extensions

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(b) Holes	Any number up to 4 maximum separated by 1 in. (25 mm) with a maximum diameter of 0.50 in. (12.7 mm) one side only	Replace door (Ref. 78-32-00, P. Block 801) Refer to Over Serviceable Limit Extensions
(c) Dents	Any amount up to 0.5 in. (13 mm) deep	Replace door (Ref. 78-32-00, P. Block 801) Refer to Over Serviceable Limit Extensions
(d) Wear in bolts	Diameter not less than 0.224 in. (5.68 mm)	Replace door (Ref. 78-32-00, P. Block 801) Refer to Over Serviceable Limit Extensions
(e) Wear in sleeve bushing and flange bushings	Any amount up to 0.005 in. (0.13 mm)	Replace door (Ref. 78-32-00, P. Block 801) Refer to Over Serviceable Limit Extensions
(f) Deployed reverser for contact between slot end	Not serviceable	Trim slot end as required to eliminate interference
(g) Binding or seizing of link block-to-link support wear strip interface	Any amount as long as rotation by hand pressure can be maintained	Apply lubricant (C02-004) to link block-to-link support wear strip interface
(h) Missing and/or torn wire mesh screen	Any amount up to 18.3 sq.ft. (1.70 m^2) for a full reverser (two halves) NOTE : Do not include screenless blocker doors	Apply Material No.C01-106 to edges of wire mesh, or replace the blocker door

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	P/N 1291M28G13 and up in the missing wire mesh inspection or calculation	
(i) Clearance between the sleeves and the sleeve bushings	Any amount up to 0.02 in. (0.5 mm)	Replace the bushings as necessary
(j) Damaged or missing Teflon wear strip	No more than 60 % of the strip on each side can be missing	Remove the door and replace the wear strip
(11)Check Link Assemblies for :		
(a) Cracks	None allowed within 2 in. (51 mm) of platform. Other area - 3 maximum up to 0.25 in. (6.4 mm) long per link	Replace link (Ref. 78-32-00, P. Block 801)
(b) Nicks or dents in leading or trailing edges	Any amount up to 0.12 in. (3.1 mm) deep	Replace link (Ref. 78-32-00, P. Block 801)
(c) Bent link	Not serviceable	Replace link (Ref. 78-32-00, P. Block 801)
(d) Wear in bearing sleeve	Any amount 0.03 in. (0.8 mm) with a 0.408 in. (10.4 mm) maximum ID	Replace link (Ref. 78-32-00, P. Block 801)
(12)Deflection Limiters for :		
(a) Cracks	Not serviceable	Replace limiter (Ref. 78-32-00, P. Block 801)
(b) Delamination	Any amount	Replace limiter (Ref. 78-32-00, P. Block 801)
(c) Wear on wear surface	Any amount as long as contact exists between limiter and mating surface	Shim limiters as required (Ref. 71-13-03, P. Block 401)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(d) Missing wear surface	Not serviceable	Replace limiter (Ref. 78-32-00, P. Block 801)
(13)Deflection Limiter Tubes for :		
(a) Cracks	Not serviceable	Replace tube (Ref. 78-32-00, P. Block 801)
(b) Wear on wear surface	Any amount as long as contact exists between tube and limiter	Shim limiter as required (Ref. 71-13-03, P. Block 401)
(c) Bent or buckled tube	Not serviceable	Replace tube (Ref. 78-32-00, P. Block 801)
(14)Deflection Limiter Bumper Assembly for :		
(a) Cracked or missing split sleeve on either side	Not serviceable	Replace sleeve (Ref. 78-32-00, P. Block 801)
(b) Freedom of movement (rotating laterally)	Not serviceable	Replace bumper assembly (Ref. 78-31-00, P. Block 501)
(15)Wear Pads for :		
(a) Wear	Any amount up to 0.06 in. (1.5 mm) deep	Replace pad (Ref. 71-13-03, P. Block 401)
(b) Cracks	Not serviceable	Replace pad (Ref. 71-13-03, P. Block 401)
(16)Mounting Brackets for:		
(a) Cracks	Not serviceable	Replace reverser half (Ref. 71-13-03, P. Block 401)
(17)Access Panel Blowout Doors for :		
(a) Cracks	Any number any length up to 0.5 in. (12.7 mm) with a total accumulation of	Replace panel (Ref. 78-32-00, P. Block 801)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
	2 in. (50.8 mm) separated by 0.5 in. (12.7 mm)	
(b) Broken or missing latches	Not serviceable	Replace latch (Ref. 78-32-00, P. Block 801)
(c) Gap in plastic covering blowout door cable	Any amount up to 1 in. (25.4 mm)	Replace cable (Ref. 78-32-00, P. Block 801)
(18)Hold Open Rod Ball Lockpin for :		
(a) Wear/ elongation	Any amount provided ball lock pin remains engaged	Replace hold open rod (Ref. 78-32-00 P. Block 801)
POST GE SB 78-101 * * * (TRANSLATING COWLS WITH CAST ACTUATOR SUPPORT FITTINGS)		
(19)Upper Center/Lower Cast Actuator Support Fitting for: (See NOTE 1)		
(a) Cracks up to 0.25 in. (6.4 mm) long	Not serviceable	Blend the cracked area. Remove material as needed. Apply Material No. C03-006 and Material No. C03-005 to blended area
(b) Cracks greater than 0.25 in. (6.4 mm) but not more than 2.0 in. (51 mm) long	Not serviceable	Repair cast actuator support fitting (Ref. 78-32-00, P. Block 801)
END POST GE SB 78-101		
(20)Hinge Bolts for :		
(a) Structural damage to the bolt heads	Not serviceable	Replace the bolts
(b) Structural damage to the nuts	Not serviceable	Replace the nuts



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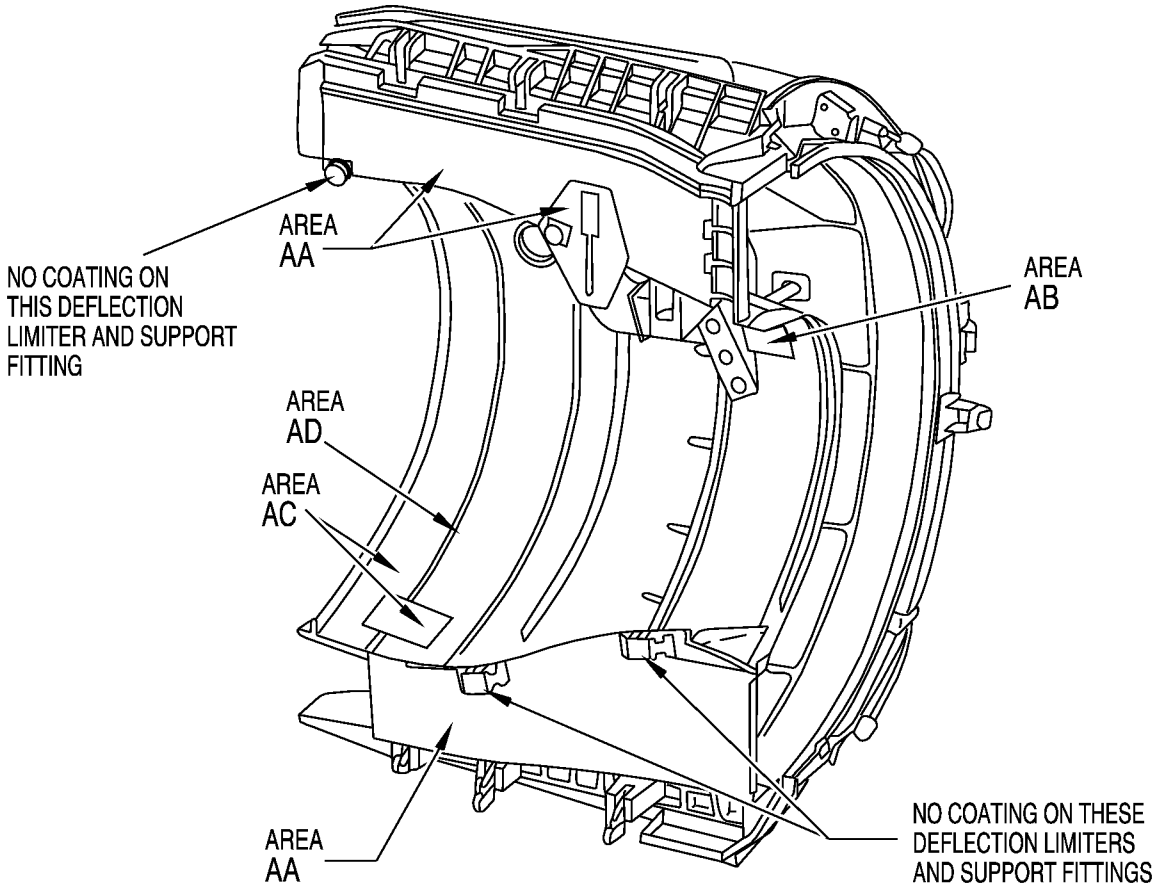
Translating Cowl Trailing Edge Blended Repair
Figure 608

R


NO COATING ON THIS DEFLECTION LIMITER AND SUPPORT FITTING
AREA AA
AREA AB
AREA AD
AREA AC
AREA AA
NO COATING ON THESE DEFLECTION LIMITERS AND SUPPORT FITTINGS

	COATING REQUIREMENTS				
COATING AREAS	C01-014 PRIMER	C01-015 INSULATION		C01-008 RTV SEALANT	
			THICKNESS		THICKNESS
AA	X	X	0.060-0.090 IN (1.52-2.29 MM)	X	0.005-0.010 IN (0.13-0.25 MM)
AB	X	X	0.080-0.110 IN (2.03-2.79 MM)	X	0.005-0.010 IN (0.13-0.25 MM)
AC	X	X	0.130-0.160 IN (3.30-4.06 MM)	X	0.005-0.010 IN (0.13-0.25 MM)
AD	X	X	0.200-0.230 IN (5.08-5.84 MM)	X	0.005-0.010 IN (0.13-0.25 MM)

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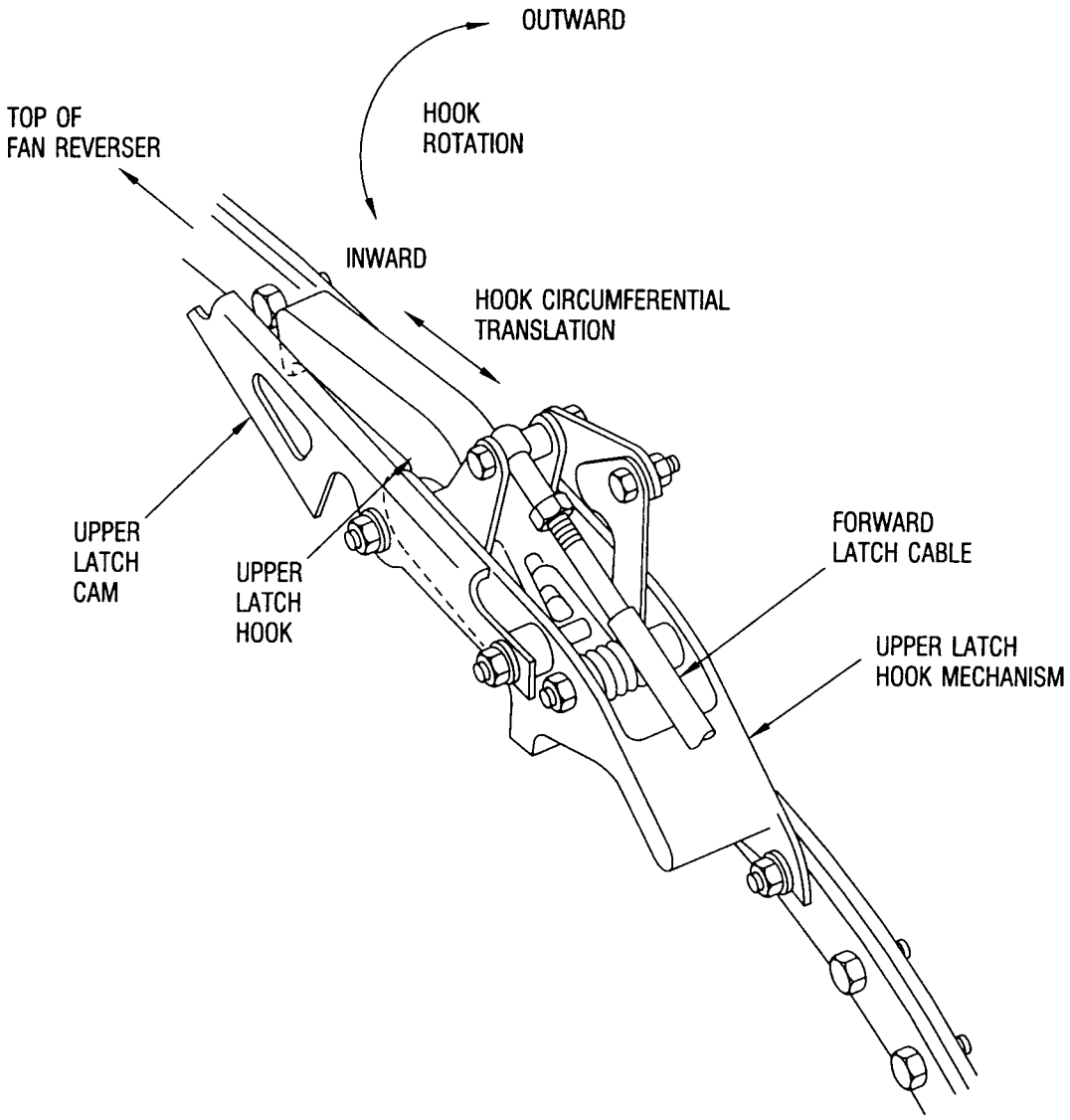
R MA25S Coating Requirements
Figure 609



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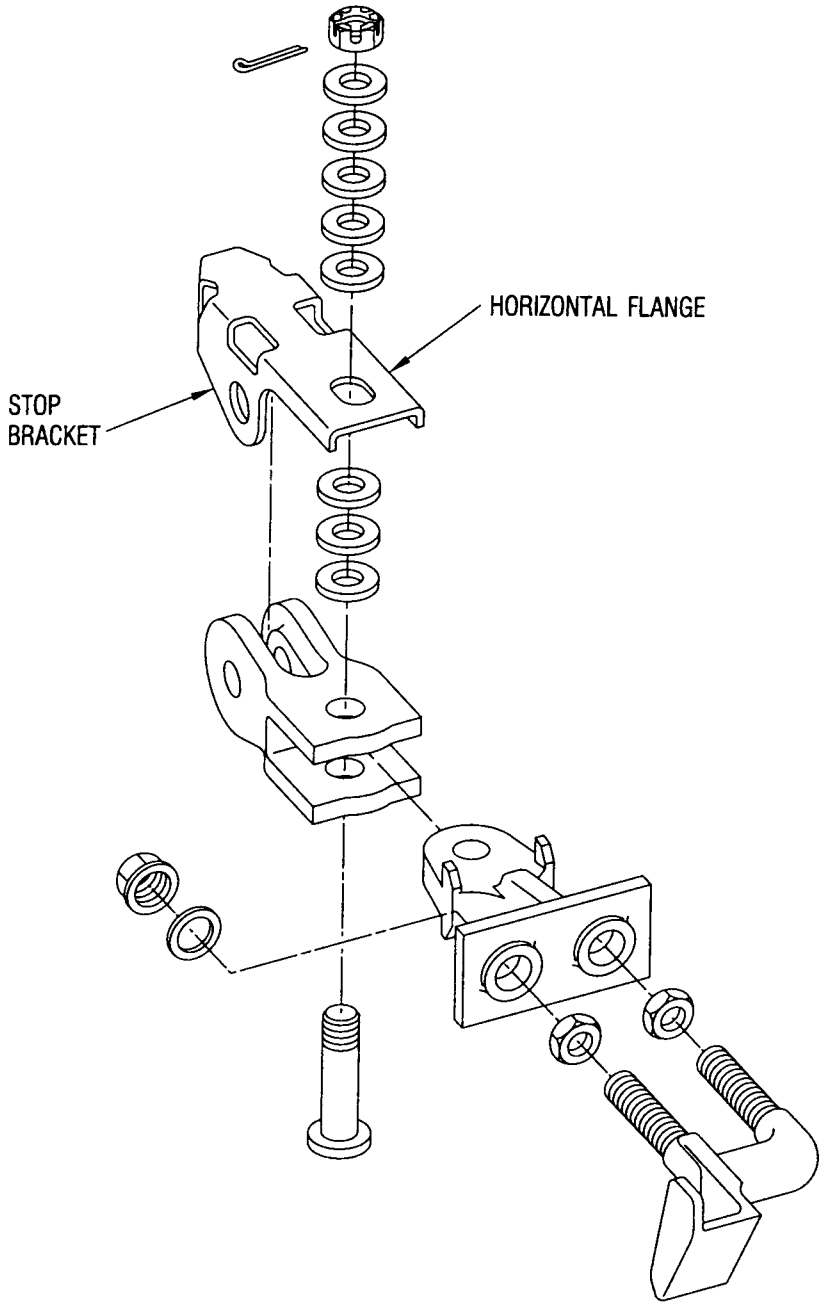
Upper Latch Cam
Figure 610



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U-Bolt Assembly - Stop Bracket
Figure 611

NOTE 1 : (Ref. Fig. 612).

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
POST MRAS SB 78-1109		
(21)Lower blowout/access door closeout tee		
(a) Wear of the wearstrips	0.032 in. (0.81 mm) maximum wear permitted	Replace the wearstrip
END POST MRAS SB 78-1109		

C. Hold Open Rod Inspection
With the Fan Cowl doors open and the Fan Reverser halves closed, accomplish the following :
(1)Inspection of hold-open rod assembly (Ref. Fig. 613)
(a)Remove the ball-lok pin allowing hold-open rod assembly to extend.
(b)Visually inspect hold-open rod assembly for a wear groove. The wear groove if present, will be located on Rod Assembly Inner Strut just below the Ball-Lock Pin hole.
(c)Measure the wear groove depth and record. The maximum allowable wear depth is 0.30 in. (0.76 mm). If wear exceeds allowable limits, remove the Hold-Open Rod and repair the worn area per the following steps. If the wear does not exceed allowable limits, stow the Hold-Open Rod and continue service.
(2)Hold-Open rod assembly rework (Ref. Fig. 613)
(a)Remove hold-open rod assembly from the fan reverser (Ref. 78-32-00, P. Block 801).
(b)Weld repair rod assembly inner strut wear groove flush with adjacent area using AMS 4190 filler material.
(c)Grind excess weld material to achieve original contour.
(d)Apply surface treatment (C03-006) to repair area.
(e)Apply epoxy restin primer (C03-005) to repair area.
(f)Remove any obvious burrs or sharp edges found on the interior edge of the outer strut end.
(g)Install hold-open rod assembly (Ref. 78-32-00, P. Block 801).

D. Over-Serviceable-Limit Extensions
In the course of inspections/checks of the fan reverser, there will be occasions when a specific defect will exceed the "Maximum Serviceable" Limit. The corrective action given for the condition may exceed the maintenance capability at a given location. To permit the engine to be returned to a location where the defect can be corrected, or to permit the necessary maintenance to be scheduled within the extension period, the following extensions are provided :
NOTE : The limit extensions are a one-time extension only. Appropriate hardware action must be taken at the completion of the extended serviceable period.
(1)Translating cowl assembly

CONDITION	MAXIMUM EXTENSION
(a) Blocker door Assembly:	
1 Maximum of one blocker door removed	30 flight hours provided the reverser is deactivated and the pieshaped blocker door fairings on each side of removed blocker door are removed. (Ref. 78-32-00, P. Block 801 and 78-31-00, P. Block 901).

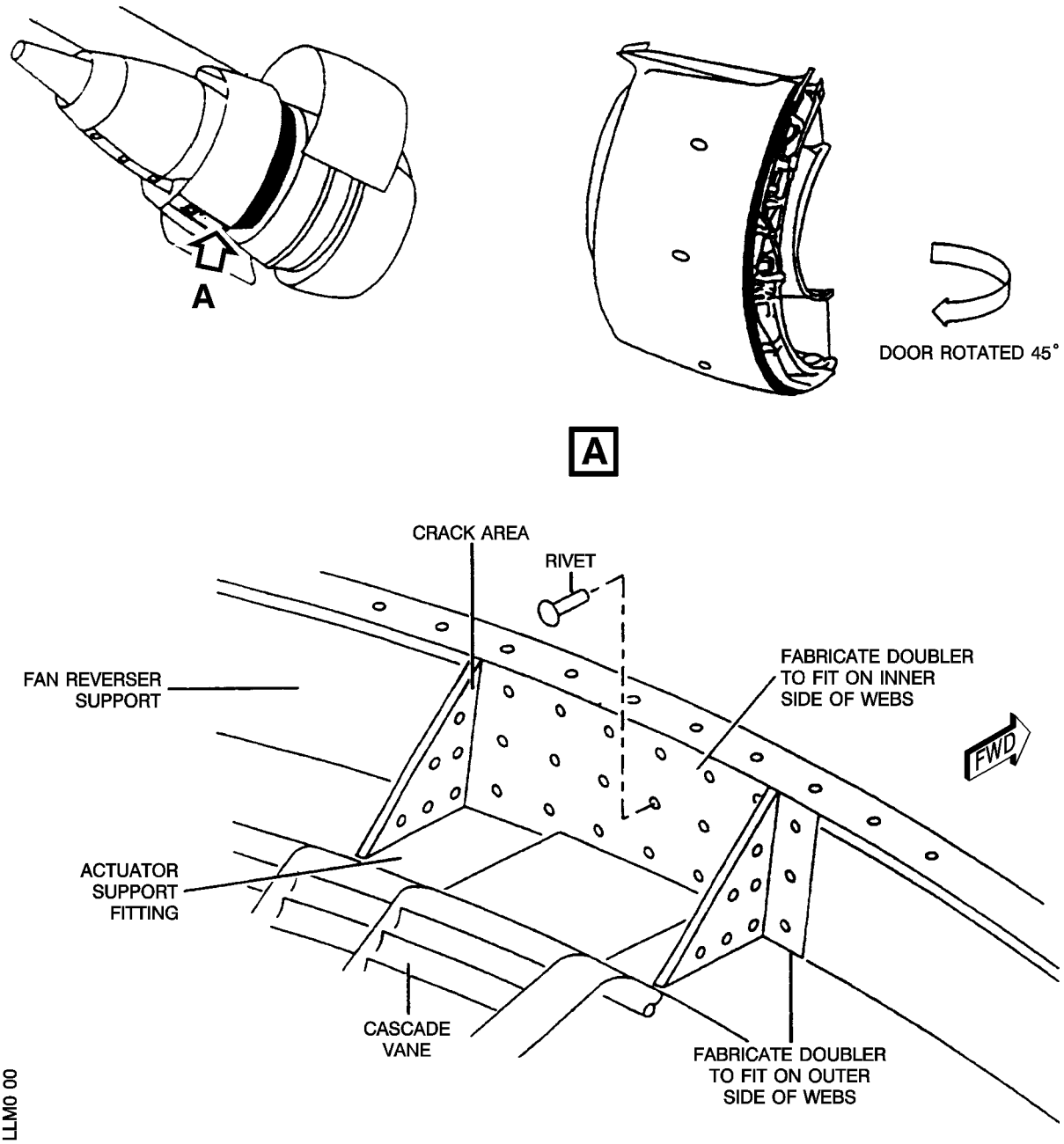
E. Close-Up
(1)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed

onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

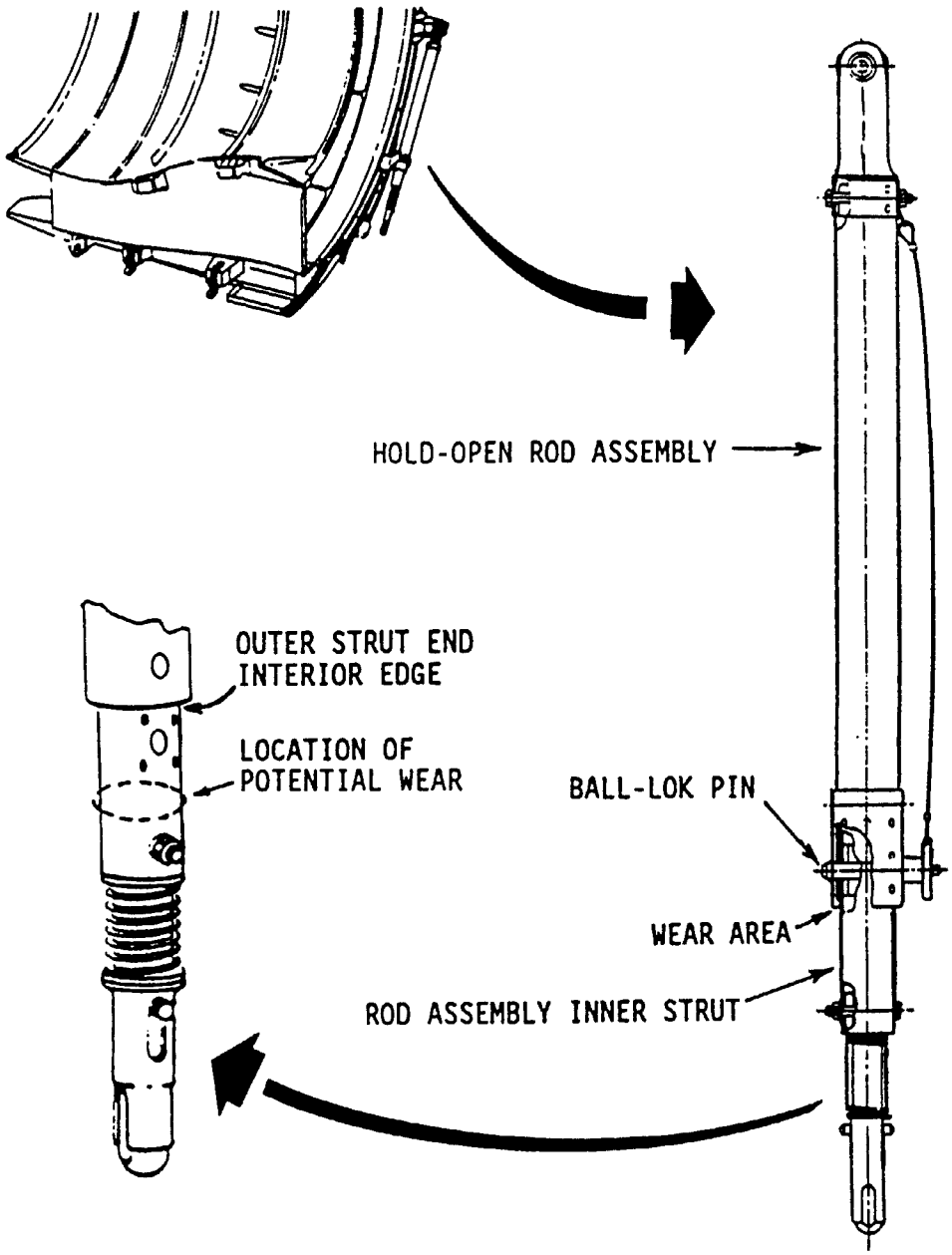
(2)Remove access platform.

(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(4)Close thrust reverser and fan cowl doors, remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).



Cast Actuator Support Fitting
Figure 612



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Hold-Open Rod Assembly
Figure 613

FAN REVERSER ASSEMBLY - APPROVED REPAIRS

1. General

Instructions provided in this procedure are for repair of damaged subassemblies of the fan reverser assembly with the reverser installed on the pylon.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Paint Spray Gun
B.	Righ Angle Grinder, Air Driven Scales
C.	Scales
D.	Vacuum Cleaner
E.	Dust Mask
F.	Polyethylene Gloves
G.	Acid Brush
H.	Silicone Rubber Pad approximately 7X7X1 in. (178X178X25 mm).
I.	Access Platform
J.	Paint Spray Cup
K.	Paint Shaker
L.	Chipping or Peeling Fiber Tool
M.	Sandpaper (320/280)
N.	Sandpaper (400)
O.	Pneumatic Sander
P.	Styrofoam Sanding Block
Q.	Spatula, Non-Metallic
R.	Masking Tape
S.	Scissors
T. Material No.C01-007	Adhesives, Plastics, Sealants (Ref. 70-00-00)
U. Material No.C01-080	Adhesives, Plastics, Sealants (Ref. 70-00-00)
V. Material No.C01-106	Adhesives, Plastics, Sealants (Ref. 70-00-00)
W. Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
X. Material No.C01-116	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Y. Material No.C01-117	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Z. Material No.C01-129	Adhesives, Plastics, Sealants (Ref. 70-00-00)
AA.Material No.C02-004	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
R AB.Material No.C02-032	Anti-Seize Compounds, Lubricants, Oils
R	(Ref. 70-00-00)
R AC.Material No.C03-001	Finishes and Protective Coatings (Ref. 70-00-00)
R AD.Material No.C03-002	Finishes and Protective Coatings

ITEM	DESIGNATION
	(Ref. 70-00-00)
R AE.Material No.C03-005	Finishes and Protective Coatings (Ref. 70-00-00)
R AF.Material No.C03-006	Finishes and Protective Coatings (Ref. 70-00-00)
R AG.Material No.C03-056	Finishes and Protective Coatings (Ref. 70-00-00)
R AH.Material No.C03-057	Finishes and Protective Coatings (Ref. 70-00-00)
R AI.Material No.C03-059	Finishes and Protective Coatings (Ref. 70-00-00)
AJ.Material No.C03-060	Finishes and Protective Coatings (Ref. 70-00-00)
AK.Material No.C03-062	Finishes and Protective Coatings (Ref. 70-00-00)
AL.Material No.C03-063	Finishes and Protective Coatings (Ref. 70-00-00)
AM.Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
AN.Material No.C04-014	Cleaning Compounds and Solvents (Ref. 70-00-00)
AP.Material No.C04-030	Cleaning Compounds and Solvents (Ref. 70-00-00)
AQ.Material No.C04-035	Cleaning Compounds and Solvents (Ref. 70-00-00)
AR.Material No.C10-009	Miscellaneous (Ref. 70-00-00)
AS.Material No.C10-010	Miscellaneous (Ref. 70-00-00)
AT.Material No.C10-040	Miscellaneous (Ref. 70-00-00)
AU.Material No.C10-112	Miscellaneous (Ref. 70-00-00)
AV.Material No.C10-113	Miscellaneous (Ref. 70-00-00)
AW.Material No.C10-140	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-13-03, P. Block 401	Fan Thrust Reverser Cowl
- 71-13-08, P. Block 501	Fan Thrust Reverser Mounting Ring Latch Assembly
- 78-32-00, P. Block 601	Fan Reverser Assembly

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.
(3)Remove bolts securing stored inverted lockout plate on the left and right

CDU's auxiliary drive pads. Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Repair of Penetration Damage to Transcowl

WARNING : SOME STEPS IN THE FOLLOWING PROCEDURES REQUIRE CUTTING, SANDING AND/OR ROTARY FILLING OF GRAPHITE FIBER FILLED EPOXIES. THE USE OF A VACUUM CLEANER (WITH THE INTAKE ADJACENT TO THE REPAIR AREA TO DRAW OFF GRINDING/FILLING DUST) AND APPROVED DUST MASK (TO PREVENT INHALATION OF GRINDING/FILLING DUST) SHOULD BE CONSIDERED MANDATORY.

CAUTION : REPAIR OF PENETRATION TYPE DAMAGE TO THE TRANSCOWL PER THE FOLLOWING PROCEDURES IS RESTRICTED TO AMBIENT TEMPERATURES (AT THE REPAIR AREA) OF 60°F (15.5°C) to 100°F (38°C). CONTROL OF AIR TEMPERATURES IS REQUIRED IF AMBIENT TEMPERATURE IS NOT WITHIN THE SPECIFIED LIMITS.

(1)Determine extent of damage

(a)Tap the surface of the transcowl outer skin around the damaged hole to detect the boundary of delaminated material. If material is not delaminated the impact will have the sound of a solid "click". If the surface ply is delaminated, a slightly hollow sound will result. Use felt tip pen to mark the boundary of delaminated material if present.
If the maximum dimension across the damaged area (penetration hole plus delaminated area) exceeds 4 in. (101.6 mm), the damage is NOT repairable per the following procedures. Consult inspection section of manual for part disposition.

WARNING : USE A VACUUM CLEANER WITH INTAKE HELD ADJACENT TO THE REPAIR AREA TO COLLECT CUTTING DUST AND RESIDUE. USE AN APPROVED DUST MASK TO PREVENT INHALATION OF CUTTING RESIDUE AND DUST.

(b)Using cutting disk and air driven right angle drive grinder, pliers, diagonal cutter, scissors, utility knife, etc., as required, to remove broken and/or cracked pieces of the surface ply (or plies). Use cutoff disk on the grinder to cut through the surface plies along the boundary of the delaminated area marked in Paragraph B. (1) (a). Use utility knife or scissors to spoil core under the delaminated area to permit removal of the delaminated material. Remove crushed and loose pieces of honeycomb subsurface support structure. Complete removal of honeycomb down to the inner skin is not required at this time. Use care to avoid extending the damaged area.

(c)Visually examine the inside diameter surface of the transcowl under the damaged area on the outer skin to provide additional assurance that the inner skin plies have, or have not, been damaged.
If damage is detected, remove damaged material per above step except use scissors to cut away damaged wire screen from the inner skin.

(d)Based upon the extent of damage, select the repair method indicated in Table I.

NOTE : If any of the following repairs are to be made during inclement weather conditions, provide adequate cover so that the repair and work areas can remain clean and dry.

(2)Remove contaminating liquids (fuel, engine oil, water) from the damaged

area.

(a)Remove as much liquid as possible using sponge, towels, shop cloths, etc. A wet or dry vacuum cleaner may be used.

(b)Using compressed dry air, blow dry the area.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(c)Solvent wash the area using C04-030, 1.1.1 Trichloroethane.

(d)Blow-dry area using compressed dry air.

(3)Repair penetration damage - Type A (Ref. Fig. 801)

(a)Visually examine the surface opening to assure complete removal of all loose debris. Remove loose debris.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(b)Solvent was the repair area using C04-030, 1.1.1 Trichloroethane.

(c)Blow opening dry using compressed dry air.

TABLE I

Damage Type	Damage Description	Repair Method Paragraph
WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.		
	Inside Diameter Surface NOT Damaged	
A.	1. Maximum dimension of opening in outer skin does not exceed 1.0 inch (25.4 mm)	3.B.(3)
B.	1. Maximum dimension of opening in outer skin exceeds 1.0 inch (25.4 mm) but does not exceed 2.5 inches (63.5 mm)	
	2. Maximum depth of honeycomb removal not to exceed 3/4 full honeycomb depth. Visual estimate	
	3. Average depth of honeycomb remaining within the opening not less than 1/2 full honeycomb depth. Visual estimate	
C.	1. Maximum dimension of opening in outer skin exceeds 1.0 inch (25.4 mm) but does exceed 2.5 inches (63.5 mm)	3.B.(5)
	2. Maximum depth of honeycomb removal exceeds 3/4 full honeycomb depth. Visual estimate	
	3. Average depth of honeycomb remaining within the opening is less than 1/2 full honeycomb depth. Visual estimate	
D.	1. Maximum dimension of opening in outer skin exceeds 2.5 inches (63.5 mm) but does not exceed 4.0 inches (101.6 mm)	3.B.(5)

Damage Type	Damage Description	Repair Method Paragraph
E.	1. Maximum dimension of opening in outer skin exceeds 4.0 inches (101.6 mm)	Not Repairable
F.	1. Maximum dimension of opening in inner skin does not exceed 2.0 inches (50.8 mm) and opening in outer skin does not exceed 4.0 inches (101.6 mm)	3.B.(5)
G.	1. Maximum dimension of opening in inner skin exceeds 2.0 inches (50.8 mm) and/or opening in outer skin exceeds 4.0 inches (101.6 mm)	Not Repairable

NOTE : Dimension limits on openings in inner and outer skin surfaces apply AFTER removal of broken and/or cracked skin.

(d)Mix a suitable quantity of Epocast 1310 resin (C01-116) and 9216 hardener (C01-080) in the ratio of 100 parts (by weight of Epocast 1310) to 8 parts (by weight) of C01-080 hardener.
NOTE : Epibond 8543 (A&B) (C01-117) may be used as an alternate to the Epocast 1310/9216 system for this repair. Mix Epibond 8543 in ratio of one part A to 1 part B by weight or volume. Pot life of mixed Epibond is 3 to 5 minutes at 77°F (25°C). Increased ambient temperature reduces the pot life.

(e)Using a clean spatula, tongue depressor or equivalent, wet the honeycomb walls (adjacent to the opening in the outer skin) with mixed potting compound. Fill the remaining cavity with mixed compound flush with the outer skin.

(f)Partial cure the compound for 1.5 hours at 60°F (15.6°C) or greater ambient temperature. The cure time for the alternate, Epibond 8543, is 15 minutes at 77°F (25°C).

(g)Lightly hand sand the repair area smooth and flush with the adjacent transcowl outer skin using 180 to 220 grit size sanding paper. Blow off sanding residue.

(h)If pores are exposed by sanding, fill the pores flush with the outer skin using a freshly mixed batch of potting compound or adhesive. Mix per step (d) and cure per step (f).

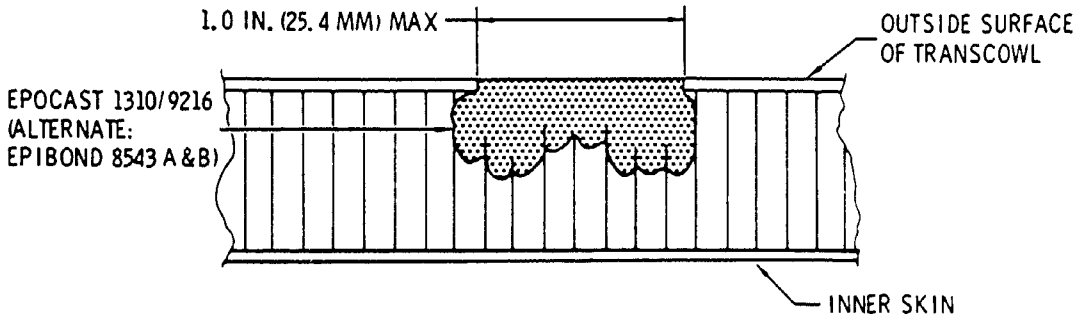
(i)Apply surface protective coating per Paragraph 3.B.(7).

(4)Repair penetration damage - Type B (Ref. Fig. 802)

(a)Visually examine the surface opening to assure complete removal of all loose core material and panel skin. Remove as required. It is not required to remove partial core material which is firmly attached to the inside surface of the inner skin. If additional material is removed, compare the cavity with the damage description for Type B and C damage (in Table I) to assure that the clean-up has not created Type C damage. Repair as specified in Table I.

(b)Make premolded graphite fabric and epoxy patch per Paragraph 3.B.(9).
WARNING : USE A VACUUM CLEANER WITH INTAKE HELD ADJACENT TO THE REPAIR

- 1.0 IN. (25.4 MM) MAX DIMENSION ACROSS SURFACE OPENING
- BACK SHEET NOT DAMAGED



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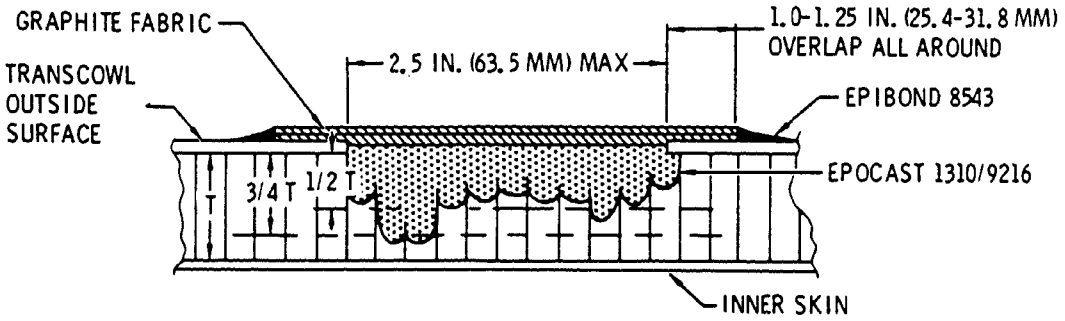
Transcowl Repair - Type A Damage
Figure 801

- MAX DIMENSION ACROSS SURFACE OPENING EXCEEDS 1.0 IN. (25.4 MM); DOES NOT EXCEED 2.5 IN. (63.5 MM)
- MAX DEPTH OF HONEYCOMB REMOVAL LESS THAN 3/4 T
- AVERAGE DEPTH OF HONEYCOMB GREATER THAN 1/2 T
- BACK SHEET NOT DAMAGED



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Transcowl Repair - Type B Damage
Figure 802

AREA. USE DUST MASK TO PREVENT INHALATION OF SANDING RESIDUE.

(c)Remove paint, charcoal colored anti-static coating and yellow primer within a 1.25-1.5 in. (31.75-38.1 mm) wide band immediately surrounding the damage opening in the transcowl outer skin using a sanding pad and 180-220 grit size sanding disk mounted on the right angle drive air driven grinder. Use caution to assure removal of the coatings and to minimize removal of graphite fabric from the top ply of the transcowl outer skin. Blow off sanding residue.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(d)Solvent wash the repair area using solvent C04-030.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

(e)Mix a quantity of Epocast 1310 using (C01-116) and 9216 hardener (C01-080) sufficient to fill the cavity in the panel. Mixing ratio : 100 parts resin to 8 parts hardener by weight.

(f)Using a clean spatula, tongue depressor, or equivalent, wet the honeycomb walls (adjacent to the opening in the outer skin) with mixed potting compound. Fill the remaining cavity with the mixed potting compound flush with the outer skin.

(g)Partial cure the mixed potting compound for 1.5 hours 60°F (15.6°C) or greater ambient temperature.

(h)Lightly hand sand the cured potting compound flush with the adjacent transcowl outer skin using 180 to 220 grit size sanding paper (or cloth). Blow off sanding residue.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT FUMES.

(i)Wipe the sanded areas of the repairs and the transcowl outer skin (adjacent to the repair) with a clean cloth wetted with solvent C04-030.

(j)Cut an opening in a piece of mylar film, grease proof paper (C10-009) or equivalent, to surround the repair area. The opening should match the edge of the sanded area [1.25-1.5 in. (31.75-38.1 mm) from the edge of the filled hole] on the transcowl outer skin but be approximately 0.25 in. (6.4 mm) larger (all around) than the sanded area. Tape down the edges of the opening (in the film or paper) with teflon tape (C10-040). Tape the outer edges of the film/paper mask to hold the mask in position and out of the way.

(k)Cut a piece of the premolded graphite fabric [paragraph 3.B.(9)] to fit within the opening in the mask and to extend 1.0-1.25 in. (25.4-31.8 mm) beyond the edge of the filled cavity. Note the orientation of the patch on the sanded area to assist in positioning the patch when the adhesive is applied. Make a small 0.125 in. (3.18 mm) notch at the edge of the patch if required to provide a visual aligning feature. Wear clean polyethylene gloves when handling the patch to prevent contamination.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

CAUTION : STEPS (1) THROUGH (n) BELOW MUST BE ACCOMPLISHED WITH A MINIMUM TIME DELAY SINCE THE ADHESIVE WILL SET UP IN APPROXIMATELY 5 MINUTES AT 77°F (25°C). HAVE ALL MATERIALS PREPARED PRIOR TO STARTING THESE STEPS SO THAT THE MIXED ADHESIVE WILL NOT SET UP BEFORE APPLICATION AND CLEAN UP OF THE COVER PATCH.

(l)Mix a quantity of Epibond 8543 adhesive (parts A&B) (C01-117) sufficient to cover the repair area (filled hole and surrounding sanded area) and the mating surface of the patch. Mixing ratio : 1 part A (resin) to 1 part B (hardener) by weight or volume.

1 Coat the repair area (filled hole and surrounding sanded area) with mixed adhesive. Thoroughly wet and completely cover the area using an acid brush to spread the adhesive. Spread the adhesive using a criss-cross brushing pattern.

2 Coat the surface of the patch which mates with the repair area with mixed adhesive. Thoroughly wet and completely cover the patch using an acid brush (or equivalent) to spread the adhesive. Spread the adhesive using a criss-cross brushing pattern.

(m)Quickly align the patch over the coating repair area and press into position using the orientation feature to assist in alignment. The adhesive coated surface of the patch should face the repair. Hold the patch with one hand while rolling the patch with the side of the other hand to work air bubbles and excess adhesive out from under the patch. Use a squeegee to remove excess extruded adhesive.

(n)Cover the patch with a thick silicone rubber pad [approximately 7x7x1 in. (178x178x25 mm)] and hold firmly in place for approximately 10 minutes.

(o)Carefully remove the rubber pad and masking.

(p)Clean up the repair area. Pry-chip off adhesive which overlapped the teflon tape ; hand sand rough spots and excess adhesive. Smooth sharp edges.

(q)Using a tapping tool, tap test the patch to locate spots/areas where the patch is not bonded. Three spots not exceeding 0.75 in. (19.1 mm) in diameter are permitted provided the spots are separated by at least 1.0 in. (25.4 mm) and no spot is less than 0.50 in. (12.7 mm) from the edge of the patch.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(r)Wipe the repair area with a clean cloth wetted with solvent (C04-030) and allow the area to dry.

(s)Apply surface protective coating per paragraph 3.B.(7).

(5)Repair penetration damage - Type C and D (Ref. Fig. 803)

WARNING : USE A VACUUM CLEANER WITH INTAKE HELD ADJACENT TO THE REPAIR AREA TO COLLECT CUTTING DEBRIS AND SANDING DUST. USE IN APPROVED DUST MASK TO PREVENT INHALATION OF DUST.

(a)Using rotary file, cutting disk, sanding disk, diagonal cutters, pliers and scraping tool [0.50-1.0 in. (12.7-25.4 mm) wide blade], remove the remaining honeycomb (within the confines of the surface opening in the outer skin) down to the inner skin. With the majority of the honeycomb removed (by cutting, filing, or pulling) remove the residual honeycomb

with rotary file, scraper or small sanding disk. Use caution to avoid puncturing or cracking the inner skin.

(b) Remove paint, charcoal colored anti-static coating and yellow primer within a 1.25-1.5 in. (31.75-38.1 mm) wide band immediately surrounding the damage opening in the transcowl outer skin. Use a sanding pad and 180-220 grit size sanding disk mounted on a right angle drive air driven grinder. Use caution to minimize removal of graphite fabric from the top ply (outer skin) of the transcowl surface.

(c) Make a premolded graphite fabric and epoxy patch per paragraph 3.B.(9).

(d) Vacuum clean the repair area to remove loose debris and sanding dust.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(e) Clean the bottom (inside surface of the inner skin) of the cavity and adjacent honeycomb walls with solvent (C04-030). Wipe up excess solvent and blow dry.

(f) Cut a plug of honeycomb core material (C10-113) to fit the cavity, with 0.05-0.10 in. (1.27-2.54 mm) interference around the plug.

(g) Tape a clean piece [approximately 12.0x18.0 in. (304.8x457.2 mm)] of grease proof paper (C10-009) or mylar film to a work surface.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

CAUTION : STEPS (h) AND (i) MUST BE ACCOMPLISHED WITH A MINIMUM TIME DELAY SINCE THE ADHESIVE WILL SET UP IN APPROXIMATELY 5 MINUTES AT 77°F (25°C). HAVE ALL MATERIALS PREPARED PRIOR TO STARTING THESE STEPS SO THAT THE ADHESIVE IN THE CAVITY WILL NOT SET UP BEFORE INSTALLING THE HONEYCOMB PLUG.

(h) Mix a quantity of Epibond 8543 adhesive (parts A&B) (C01-117) sufficient to cover the bottom of the cavity in the transcowl, load the bottom of the honeycomb plug and coat the adjacent walls of the parent honeycomb and the plug. Mixing ratio : 1 part A (resin) to 1 part B (catalyst) by weight or volume.

(i) Using and acid brush, or equivalent, liberally coat the bottom of the cavity (inside surface of the inner skin) with the mixed adhesive, using a criss-cross brushing pattern to assure complete coverage. Brush the adhesive up the walls of the adjacent parent honeycomb. Spread a 0.063 in. (1.6 mm) thick layer of mixed adhesive on the taped-down grease proof paper covering an area approximately 1.0 in. (25.4 mm) larger (length and width) than the flat surface of the Nomex plug.

1 Press the Nomex plug into the adhesive on the paper and slide the plug back and forth and in a circular motion to pick up adhesive on the bottom of the cell walls.

2 Using the acid brush (or equivalent) coat the outside walls of the plug with adhesive.

3 Press the plug into the cavity with the adhesive charged cell ends against the bottom of the cavity. Firmly hold the plug in the cavity until the adhesive sets up [approximately 5 minutes at 77°F (25°C)].

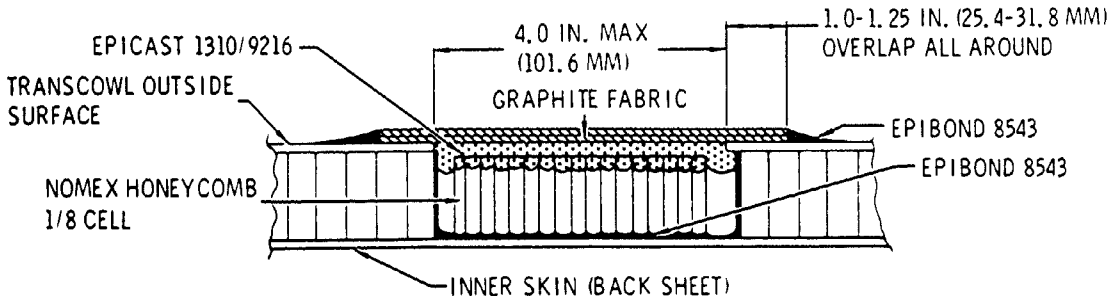
4 While the adhesive is setting up, wipe or scrape off excess adhesive around the plug.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN

- MAX DIMENSION ACROSS SURFACE OPENING

  TYPE C - MAX DIMENSION EXCEEDS 1.0 IN. (25.4 MM); DOES NOT EXCEED 2.5 IN. (63.5 MM)
  TYPE D - MAX DIMENSION EXCEEDS 2.5 IN. (63.5 MM); DOES NOT EXCEED 4.0 IN. (101.6 MM)

- BACK SHEET NOT DAMAGED



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Transcowl Repair - Type C and D Damage
Figure 803

AND USE ONLY WITH ADEQUATE VENTILATION.

(j)Mix a quantity of Epocast 1310.9216 (C01-116/C01-080) to fill the top of the honeycomb cells 0.05-0.10 in. (1.27-2.54 mm) below the outside surface of the transcowl, and to fill the remainder of the cavity flush with the sanded transcowl surface of the transcowl, and to fill the remainder of the cavity flush with the sanded transcowl surface adjacent to the cavity.

(k)Using a spatula (or equivalent) work the mixed potting material into the cells of the plug to a depth of 0.05-0.10 in. (1.27-2.54 mm). Add additional potting material to fill the ramainder of the cavity to be flush with the sanded area surrounding the now filled cavity in the transcowl outer skin.

(l)Allow the mixed Epocast 1310 potting material to cure for 1.5 hours at 60°F (15.6°C) or greater temperature.

(m)Apply a premolded graphite fabric cover over the repair area per paragraphs 3.B.(4)(h) through 3.B.(4)(r).

(n)Apply surface protective coating per paragraph 3.B.(7).

(6)Repair penetration damage - Type F (Ref. Fig. 804)

WARNING : USE A VACUUM CLEANER WITH INTAKE HELD ADJACENT TO THE REPAIR AREA. USE APPROVED DUST MAKS TO PREVENT INHALATION OF GRINDING/ SANDING DUST.

(a)Using a rotary file, cut off disk, sanding disk, pliers, scrapers [0.5-1.0 in. (12.7-25.4 mm) wide blade], etc., remove damaged/delaminated outer skin, remaining honeycomb AND UNDAMAGED honeycomb as necessary to permit installing an inside patch over the opening in the inner skin of the transcowl. Trim away any remaining loose or broken pieces of the inner skin. DO NOT EXCEED the 2.0 in. (50.8 mm) maximum dimension limit.

1 Remove damaged and UNDAMAGED honeycomb to fully expose a 1.0-1.13 in. (25.4-28.7 mm) wide band of inside surface (of the transcowl inner skin) surrounding the opening in the inner skin. Enlargement of the opening in the outer skin, to a maximum opening dimension of 4.0 in. (101.6 mm), is permitted in order to get working access to the inner skin. Use the cutoff disk to cut through the outer skin.

WARNING : USE A VACUUM CLEANER WITH INTAKE HELD ADJACENT TO THE REPAIR AREA. USE APPROVED DUST MAKS TO PREVENT INHALATION OF GRINDING/SANDING DUST.

CAUTION : APPLY LITTLE OR NO PRESSURE ON INNER SKIN TO MINIMIZE THE POSSIBILITY OF DELAMINATING THE INNER SKIN.

2 Sand the inside surface of the inner skin to provide a smooth surface on which to bond the inside patch using air grinder with sanding disk.

(b)Make a premolded graphite fabric and epoxy patch per paragraph 3.B.(9).

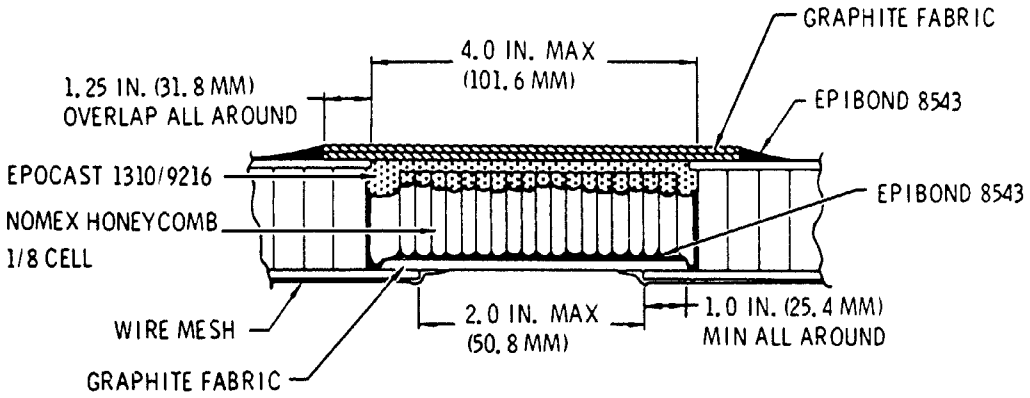
(c)Remove loose debris, sanding/scraping residue with a vacuum cleaner.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(d)Solvent clean the inside surfaces of the cavity with solvent (C04-030). Wipe up excess solvent and allow the cavity to air dry.

(e)Cut a template [from grease proof paper (C10-009) or other clean paper] to cover the cleaned-off area and opening in the inner skin. The template should extend at least 1.0 in. (25.4 mm) beyond the edge of the opening in the inner skin.

- MAX DIMENSION ACROSS SURFACE OPENING IN BACK SHEET DOES NOT EXCEED 2.0 IN. (50.8 MM)
- MAX DIMENSION ACROSS SURFACE OPENING IN FACE SHEET DOES NOT EXCEED 4.0 IN. (101.6 MM)



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Transcowl Repair - Type F Damage
Figure 804

CAUTION : WEAR CLEAN POLYETHYLENE GLOVES DURING THE FOLLOWING STEPS TO PROTECT THE HANDS FROM EPOXY MATERIALS AND TO PREVENT CONTAMINATING BONDING SURFACES OF THE TRANSCOWL AND REPAIR MATERIALS.

(f) Cut an inner patch of premolded graphite fabric to match the template [step (e) above]. Check the fit of the patch in the repair opening ; check to assure that high material on the cleaned off surface will not prevent the patch from seating on the inner skin. Trim patch and/or sand the inner skin inner surface as required. Clean up the repair opening if trimming and/or sanding was required.

(g) Cut a "plug" of Nomex honeycomb core (C10-113) to fit the repair opening with 0.05-0.10 in. (1.27-2.54 mm) interference around the plug.

(h) Tape a piece of mylar film or grease proof paper (C10-009) [approximately 12.0x18.0 in. (304.8x457.2 mm)] to the work surface to provide a clean surface on which to work with the plug, patch, and adhesive.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

CAUTION : STEPS (i)THROUGH (1) BELOW MUST BE ACCOMPLISHED WITH MINIMUM TIME DELAY SINCE THE MIXED ADHESIVE WILL SET UP IN APPROXIMATELY 5 MINUTES AT 77°F (25°C). HAVE ALL MATERIALS PREPARED PRIOR TO STARTING THESE STEPS SO THAT THE MIXED ADHESIVE WILL NOT SET UP BEFORE APPLICATION OF THE PATCH INTO THE REPAIR OPENING.

(i) Mix a quantity of Epibond 8543 adhesive (parts A&B) (C01-117) sufficient to cover the cleaned area of the inside surface of the inner skin and the mating area of the cut-to-fit patch. Mixing ratio : 1 part A (resin) to 1 part B (hardener) by weight or volume.

(j) Coat the cleaned area on the inside surface of the inner skin with mixed adhesive. Completely wet and cover the area using an acid brush (or equivalent) to spread the adhesive in a criss-cross brushing pattern. If the inside diameter surface of the inner skin is covered with wire mesh, work some of the adhesive over the exposed cut wires all around the opening to tie the wire ends down.

(k) Coat a 1.0-1.25 in. (25.4-31.8 mm) wide band (the mating surface) around the outside of the repair patch with mixed adhesive. Thoroughly cover and wet the mating surface using an acid brush (or equivalent) to spread the adhesive in a criss-cross brushing pattern.

(l) Align the patch with the cleared and adhesive coated area in the repair opening and press into position. Apply light pressure to hold the patch in position. Apply light pressure to hold the patch in position while the adhesive sets up. Too much pressure may cause delamination of the inner skin.

(m) Maintain pressure on the patch for 5 to 10 minutes while the patch cures.

(n) Prepare outer surface of the transcowl [1.25-1.5 in. (31.8-38.1 mm) wide band around the repair cavity opening] and install honeycomb plug per paragraphs 3.B.(5)(b) through 3.B.(5)(1). Make the premolded graphite fabric patch as specified.

(o) Apply the premolded graphite fabric patch on the repair area per

paragraphs 3.B.(4)(h) through 3.B.(4)(r).

(p)Apply surface protective coating per paragraph 3.B.(7).

(7)Application of surface protective coating.

(a)Lightly abrade the outer surface of the repair area and a band of the transcowl painted surface approximately 1.0 in. (25.4 mm) wide around the repair area. Use Scotchbrite pad (C10-010) to abrade the surface only as necessary to dull the surface shine and remove any loose oxidized paint if present.

WARNING : HYDROCARBON SOLVENTS ARE TOXIC. AVOID FREQUENT AND/OR PROLONGED CONTACT WITH SKIN. AVOID BREATHING SOLVENT VAPORS.

(b)Wipe the abraded area rapidly with a clean cloth wetted with solvent (C04-030). Do not permit the wetted cloth to dwell on any one area. The wiping is intended only to remove the abraded residue and any oily film which may be present.

(c)Mix Bostik product 463-03-9 (A&B) (C03-056) Boeing 707 Aircraft Gray paint and Thinner TL29 (C03-057) for spray application.

1 Mix a sufficient quantity of paint to provide approximately four fluid ounces of mixed paint and thinner. Mixing ratio of paint : 3 parts A (resin) to 1 part B (catalyst). Mixing ratio of mixed paint to thinner 3 parts mixed paint to 1 part thinner.

2 After mixing, allow the thinned paint to stand for 20 to 30 minutes. Agitate (stir) the mixture after standing period.

(d)Pour mixture into spray cup of paint spray gun such as DeVilbiss No. EGA502-395. Adjust spray gun to spray paint. Use higher air pressure for more viscous paint mixture.

WARNING : USE BREATHING MASK APPROPRIATE FOR SPRAY PAINTING TO PREVENT INHALATION OF PAINT DROPLETS.

(e)Apply first coat, sprayed thin, completely wetting (covering) the prepared area [repair area plus 1.0 in. (25.4 mm) boundary]. Overspray is permitted.

(f)Allow solvents to flash off for 20 to 30 minutes.

(g)Agitate (stir) the mixture in the paint cup.

WARNING : USE BREATHING MASK APPROPRIATE FOR SPRAY PAINTING TO PREVENT INHALATION OF PAINT DROPLETS.

(h)Apply a second wet coat to provide a final dry coat of approximately 0.003 in. (0.076 mm) thickness.

(i)Paint will cure to tack free condition in 4 hours at 77°F (25°C). Protect the surface as much as possible from contamination by airborne dust.

(j)Complete cure at 77°F (25°C) will occur after 7 days. A rapid cure can be achieved by allowing the solvents to flash off for 1 hour followed by hot air application for 2 hours at 150°F (65.6°C). Protect the surface as much as possible from contamination by airborne dust.

(8)Exhaust - Fan reverser - Paint and filler instructions

(a)Reason

The improvement described in this procedure is applicable on CF6-80C2 Fan Reversers before S/N 637/638-049.

Presently the outer painted surface of the Translating Cowl is crazing at the filler material joint during field use.

This SB GE 78-014 provides new instructions for reworking and repainting the affected Transcowls. The new instructions utilize the filler

material (C01-129) for the Translating Cowls and eliminates the filler material requirement at the fairing joints. The rain erosion paint is also eliminated for the entire Translating Cowl.

(b)Accomplishment instruction (Ref. Fig. 805, 806, 807)

With the Transcowl removed (Ref. 71-13-03, P. Block 401), accomplish the following :

1 Removal of Existing Exterior Top Coat

CAUTION : ENSURE THAT DAMAGE TO THE TRANSCOWL COMPOSITE STRUCTURE DOES NOT OCCUR DURING SANDING.

Sand entire exterior surface of the Transcowl to remove top coat and primer.

Determine the inner and outer bondment mateline (Ref. Fig. 805)

CAUTION : SEALANT BAND WIDTH MAY RANGE FROM 0.75 TO 8.00 IN. (19.1 TO 203.2 mm), ON THE BONDMENTS NUMERICALLY DEFINED IN THE EFFECTIVITY STATEMENT. DO NOT DAMAGE BONDMENTS DURING SEALANT REMOVAL. THE JOINT BETWEEN THE FORWARD AND AFT BONDMENTS VARIES ONLY DUE TO THE AMOUNT OF SEALANT USED TO BLEND THE CONTOUR.

Mechanically remove existing sealant from mateline joint by chipping or peeling with a suitable fiber tool.

Remove any loose dirt, dust, chips, etc.

Grind 0.020-0.060 in. (0.6-1.52 mm) X 45° chamfer on the Outer Bondment aft edge to establish Point A (Ref. Fig. 805).

Remove filler material from around the Beavertail Trailing Edge Fairing at the upper and lower end of the Translating Cowls.

WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH SKIN OR CLOTHING.

Hand-wipe with Material (C04-001) to remove any dirt or dust.

2 Application of Material (C01-129)

Obtain filler Material C01-129) and verify that it is within its shelf life to ensure desired results. Mix the two component parts of Material per the manufacturer's instructions. Record mixing date and time.

Apply 0.75 in. (19.1 mm) wide masking tape on the Outer Bondment at Point A (Ref. Fig. 805).

Lay a straight edge across the joint line between the Forward and Aft Bondments. The point where the straight edge contacts the Aft Bondment is Point T. The area between Point A and Point T defines the forward and aft edges of the area requiring application of filler material. The line created by the straight edge (between Point A and T) defines the external contour of the Filler material (C01-129).

Apply masking tape aft of Point T.

Verify that previously mixed Filler Material (C01-129) is within pot life and apply filler material between masking tape lines.

Remove masking tape.

Applied Filler must be free of pin holes and air bubbles and must have a smooth continuous surface (Ref. Fig. 805)

Cure Filler per one of the following :

- Air-cure Material for 24 hours at room temperature.
- Or air-cure for two hours at room temperature then cure for one-and-

a-half hours at 140°F (60°C) with warm air. Material (C01-129) may be wet-sanded if necessary to maintain smoothness and flatness requirements per (Ref. Fig. 805). Allow Translating Cowl halves to cool below 100°F (38°C). Check Filler surfaces for pin holes, scratches, resin-starved areas, voids, wavy patterns, or other surface irregularities.

NOTE : If any of these surface irregularities exist, proceed with the following.

If the Filler Material (C01-129) is within its shelf life, mix per paragraph (8)(b) 2 and add an additional amount of Filler to fill the irregularities in the Transcowl exterior surfaces. Allow Filler material to cure per paragraph (8)(b) 2.

NOTE : If no irregularities are found or if irregularities are filled proceed to following :

Using 320/280 aluminum oxide grit wet/dry sandpaper, a pneumatic sander, styrofoam sanding block, and clean tap water, proceed to sand filled discrepent areas of outer surfaces when filled areas are smoothed flush. Continue to wet-sand all exterior surfaces having Filler Material.

Carefully sand Filler band area. Sand only that amount required to restore contour. Check contour often using a straight edge between Points A and T.

NOTE : Subsequent primer applications will create better surface appearance.

Flush the sanded areas of the Transcowl with clean tap water and check for water break-free surfaces. Verify surfaces are water break-free. Drain excess water from the Trancowl and wipe with clean cloths.

3 Application of Material (C03-063)

Obtain Material (C03-063) and record expiration date and batch number.

Using a paint shaker, shake, then mix Primer Base and Catalyst to a one-to-one ratio.

Allow mixture to set 30 minutes before using.

NOTE : Pot life of mixture is eight hours maximum.

Stir mixed Material thoroughtly and apply to the exterior surface of the Transcowl, including the Beavertail Trailing Edge Fairing.

Cure Material (C03-063) per one of the following :

- Air-cure for three hours at room temperature
- Or air-cure for 15 minutes, then cure for 30 minutes at 145-150°F (65-70°C) with warm air.

Under good lighting conditions, check Material (C03-063) surface for uniformity of coverage, discrepencies, and smoothness of paint film.

NOTE : If the primed surface is unacceptable, wet-sand the coat of primer, check for a water break-free surface, and apply a second coat per paragraphs (8)(b)3.

The completed dry-film thickness of the Material (C03-063) is to be 0.0006-0.0018 in. (0.016-0.045 mm).

Using Material (C10-010), sand exterior primed surface to a smooth, dull appearance.

WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED

BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH SKIN OR CLOTHING.

Wipe sanded area with Material (C04-001) to remove primer dust.

4 Application of Material (C03-060)

Obtain Material (C03-060)

Verify shelf life of Material (C03-060). Record batch number and expiration date.

Shake-stir individually both component parts.

Mix the two component parts per the manufacturer's instructions.

Allow mixture to stand thirty minutes before use. Mixed material may be thinned with Material (C03-062) to a maximum of 10 % total volume of mix.

Spray-apply two cross coats of Material (C03-060) to exterior primed surface.

Allow 15 minutes between coats for solvent flash-off.

Cure Material (C03-060) per one of the following :

- Air-cure four hours at room temperature.
- Or air-cure five minutes at room temperature then cure 30-45 minutes at 230-250°F (90-100°C) with warm air.

The dry-film thickness of the Material (C03-060) upon completion is to be 0.0012-0.0018 in. (0.031-0.045 mm) thick. Measure and record thickness.

5 Application of Material (C03-059)

Obtain Material (C03-059)

Using 400 wet/dry sandpaper, lightly scuff-sand the cured Material (C03-060).

WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH SKIN OR CLOTHING.

Blow off dust and wipe with Material (C04-001)

Verify top-coat material is within shelf life. Record the batch number and expiration date.

Mix per manufacturer's instructions.

Record mix date and time.

Allow mixture to stand for 30 minutes before using. Mixed material may be thinned with Material (C03-062) to a maximum of 25 % of total volume of mix exterior surface.

Using a clean air-supply (free of oil and water), spray-apply one to two uniform coats to area, including the Beavertail Trailing Edge Fairing. Record application date and time.

Cure Material (C03-059) per one of the following :

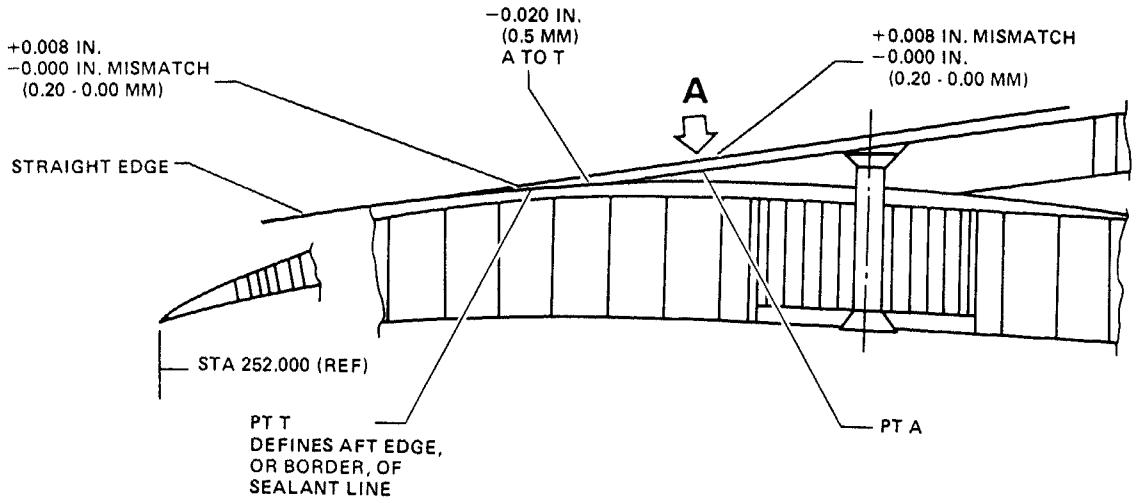
- Air-dry the coating seven hours at room temperature.
- Or air-dry 30 minutes at room temperature then cure two hours at 180-200°F (85-95°C) with warm air.

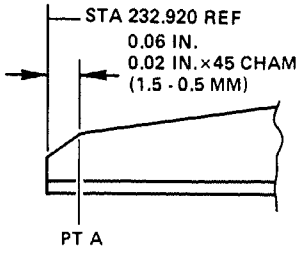
Dry-film thickness of the completed Material (C03-059) is to be 0.0015-0.0020 in. (0.039-0.050 mm).

(9)Fabricate premolded graphite and epoxy patch.

NOTE : The following procedure may be accomplished in any convenient location and need not be accomplished on the flight line.

(a)Cover the work surface with a piece of mylar film approximately





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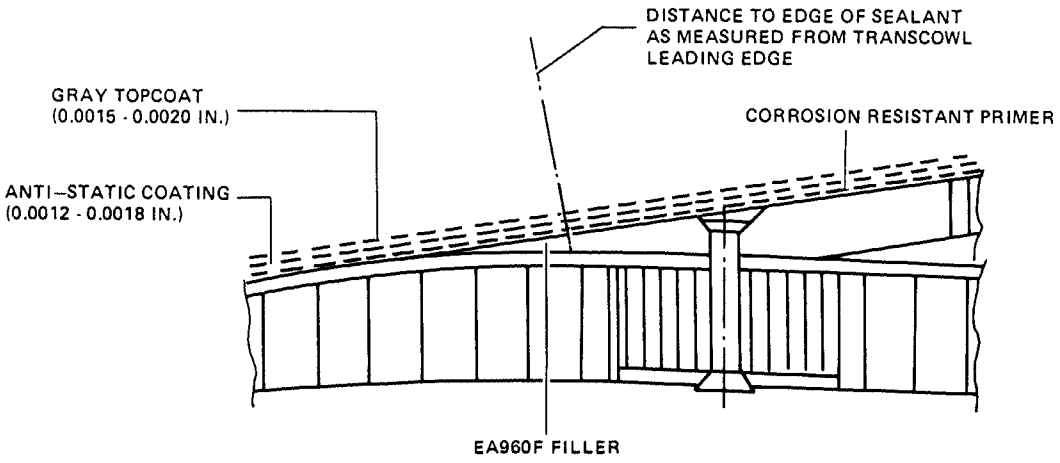
Filler Material Line Definition
Figure 805



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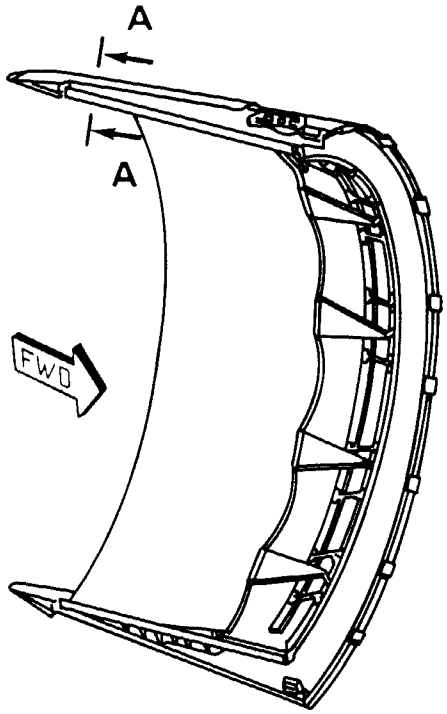
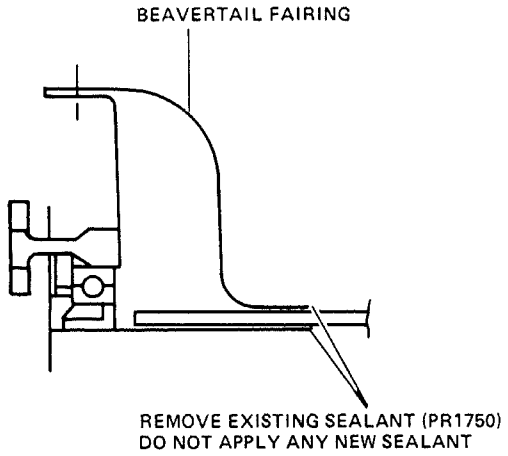
Coating Requirements
Figure 806



SECTION A-A



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Beavertail Trailing Edge Fairing
Figure 807

12.0x18.0 in. (304.8x457.2 mm). Tape in position.

(b)Cut two pieces of graphite fabric (C10-112) approximately 8.0 in. (203.2 mm) square.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

CAUTION : STEPS (c) THROUGH (i) BELOW MUST BE ACCOMPLISHED WITH A MINIMUM TIME DELAY SINCE THE ADHESIVE WILL SET UP IN APPROXIMATELY 5 MINUTES AT 77°F (25°C). HAVE ALL MATERIALS PREPARED AND AVAILABLE PRIOR TO STARTING THESE STEPS SO THAT THE MIXED ADHESIVE WILL NOT SET UP BEFORE COMPLETING THE FABRICATION OF THE PATCH.

(c)Place one of the pieces of graphite fabric on the covered work surfaces. Tape one edge of the fabric to the (film) cover and turn the fabric back over the tape (like turning a book page with the tape acting as the hinge).

(d)Mix a quantity of Epibond 8543 adhesive (parts A&B) (C01-117) sufficient to thoroughly wet out the two pieces of cut graphite fabric. Mixing ratio : 1 part A (resin) to 1 part B (catalyst) by weight or volume.

(e)Spread a thin layer of mixed adhesive on the film covering an area approximately 9.0 in. (228.6 mm) square, and adjacent to the tape holding the first piece of fabric so that the fabric can be turned bac over the spread adhesive.

(f)Turn the first graphite fabric piece back over the spread layer of adhesive. Press the fabric into the adhesive, quickly working adhesive in between the fabric threads. Remove excess adhesive and level the remaining adhesive with fabric fibers.

(g)Spread a uniform thin layer of adhesive over the filled fabric and quickly position the second patch over the first piece of fabric.

(h)Work the adhesive into and through the space between fabric threads, pressing the fabric down onto the work surface in the process.

(i)Spread a thin layer of adhesive on top of the top layer of fabric. Firmly, but carefully, smooth the adhesive over the top layer to completely fill the space between fabric threads and to leave a top surface free from bumps of excess adhesive.

(j)Allow the adhesive to set up and cure in approximately 15 minutes at 77°F (25°C).

(k)Cut off the end of the patch (which was taped) to remove the trapped piece of tape from the patch. Trim off partically separated fabric threads.

(l)Place patch in a clean polyethylene bag to protect the patch from contamination until ready for use.

C. Inner Bondment Wire Mesh Repair (Ref. Fig. 808, 809)

NOTE : Do not do this repair if you can see damage to the perforated skin beneath the wire mesh.

(1)Open the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIR FLOW. DO NOT BREATHE THE FUMES. IF YOU

GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC AND HIGHLY FLAMMABLE.

(2)Use a clean cloth moist with Material No.C04-014 to clean the repair area. Let the area air dry.
(Ref. Fig. 801)

(3)Use tape to mask off the repair area. Make sure that all of the unbonded wire mesh is inside the masked off area.

(4)Use scissors to remove loose wire mesh material in the repair area.
WARNING : IF YOU CLEAN WITH COMPRESSED AIR, IT CAN CREATE AIRBORNE PARTICLES THAT CAN GO INTO YOUR EYES OR GO THROUGH YOUR SKIN. DO NOT USE MORE THAN 30 PSIG (207 KPA) PRESSURE. WEAR GOGGLES. DO NOT POINT COMPRESSED AIR IN THE DIRECTION OF YOUR SKIN.

(5)Use 280-320 grit silicon carbide sandpaper to make the repair area lightly rough. Blow away the remaining material with dry shop air.
WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIR FLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC AND HIGHLY FLAMMABLE.

(6)Use a clean cloth moist with Material No.C04-014 to clean the repair area. Let the area air dry.
WARNING : EPOXY RESIN ADHESIVE IS AN IRRITANT. DO NOT GET THE MATERIAL IN YOUR EYES OR ON YOUR SKIN. USE IN AN AREA OPEN TO THE AIR. WEAR CLEAN NYLON FILM OR POLYETHYLENE DISPOSABLE GLOVES (C10-140) WHEN YOU MIX OR APPLY THE ADHESIVE.

(7)Use the manufacturer's instructions to prepare the paste adhesive (C01-106). To prevent the adhesive from flowing out of the repair area, prepare the adhesive approximately 20 minutes before you apply it.

(8)Use a non-metallic spatula or a brush to apply a layer of adhesive onto the repair area. The layer must be sufficiently thick to cover the edge of the wire mesh. Do not apply adhesive over the exposed perforated skin.

(9)Remove all unwanted adhesive until the adhesive is flush with the wire mesh. Use a clean non-metallic spatula.

(10)Cure the adhesive as follows :
(a)For the first hour, cure the adhesive at ambient temperature.
(b)Follow with a one-hour thermocouple-controlled cure at 180° to 200°F (82° to 93°C).
Use a heat lamp or heating blanket.
NOTE : If the above cure is not possible or not desired the adhesive can be cured for 24 hours at ambient temperature.

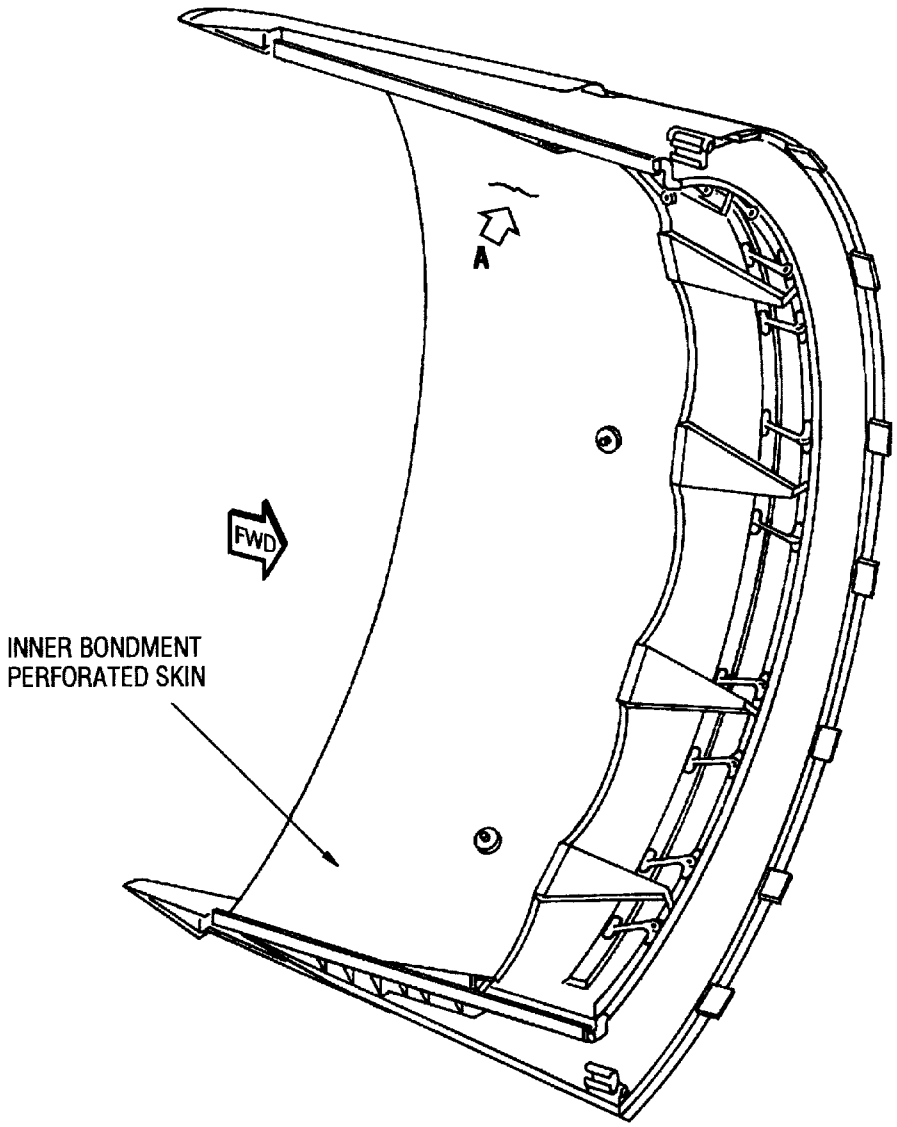
(11)Remove the tape from the repair area.

(12)Use 280-320 grit silicon carbide sandpaper lightly to make the repair area flush within 0.002 in. (0.05 mm) of the surrounding finish.
WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIR FLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC AND HIGHLY FLAMMABLE.

(13)Use a clean cloth with Material No.C04-014 to clean the repair area. Let the area air dry.

D. Replacement of Damaged Vane Deflectors
(1)Tools, Equipment and Materials. None required.
(2)Procedure (Ref. Fig. 810, 813)
(a)Deploy reverser.
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/ EQUIPMENT.
(b)Remove bolts securing stored inverted lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
CAUTION : REMOVE AND REPLACE A MAXIMUM OF TWO DEFLECTORS AT A TIME TO PREVENT THE MOVEMENT OF THE AFT SUPPORT RING. AFTER THE INSTALLATION OF EACH NEW DEFLECTOR, TORQUE THE FASTENERS TO THE CORRECT VALUE BEFORE THE REMOVAL OF THE SUBSEQUENT DEFLECTOR.
(c)Remove bolts and washers from the damaged deflector. Retain bolts and washers for reassembly.
At locations where deflection beams are located, the tri-wing screw in the vaned deflector must be removed.
(d)Remove the damaged deflector by gently pulling the deflector up and out.
CAUTION : THERE ARE TWO TYPES OF BOLT CONFIGURATIONS USED TO INSTALL THE DEFLECTORS TO THE REVERSER HALVES. MAKE SURE THE SIX POINT HEX-HEAD BOLT IS INSTALLED INTO THE AFT SUPPORT RING. INCORRECT ASSEMBLY CAN CAUSE CHAFING OF THE TRANSLATING COWL AIR-DAM.
(Ref. Fig. 810, 811)
(e)Put the new deflector in position.
1 Slide the edge of the deflector down and under the lower deflector
(f)Install the bolts and washers that you removed.
1 If you installed bolts NAS6403U4 into the aft ring, apply anti-seize compound (Material No. C02-032) to the bolt threads before installation. Remove unwanted compound after installation.
2 If you install bolts J793P005C into the aft ring, it is not necessary to apply anti-seize compound.
R (g)TORQUE the bolts to between 24 and 27 lbf.in. (0.27 and 0.31 m.daN).
(h)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(i)Stow the reverser.

E. Replacement of Mounting Ring Latch Assembly. (Ref. Fig. 812)
(1)Tools, Equipment and Materials. None required.
(2)Removal of Mounting Ring Latch Assembly.
(a)Remove reverser hold open rod as follows :



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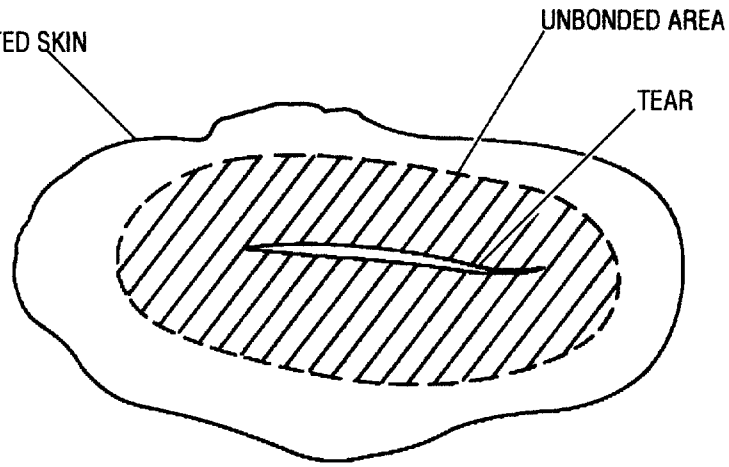
Inner Bondment Wire Mesh
Figure 808



NOTE:
THE UNBONDED AREA IS TO BE MASKED OFF
SO THAT A MINIMUM AREA WILL BE REPAIRED.

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Repair of Inner Bondment Wire Mesh
Figure 809

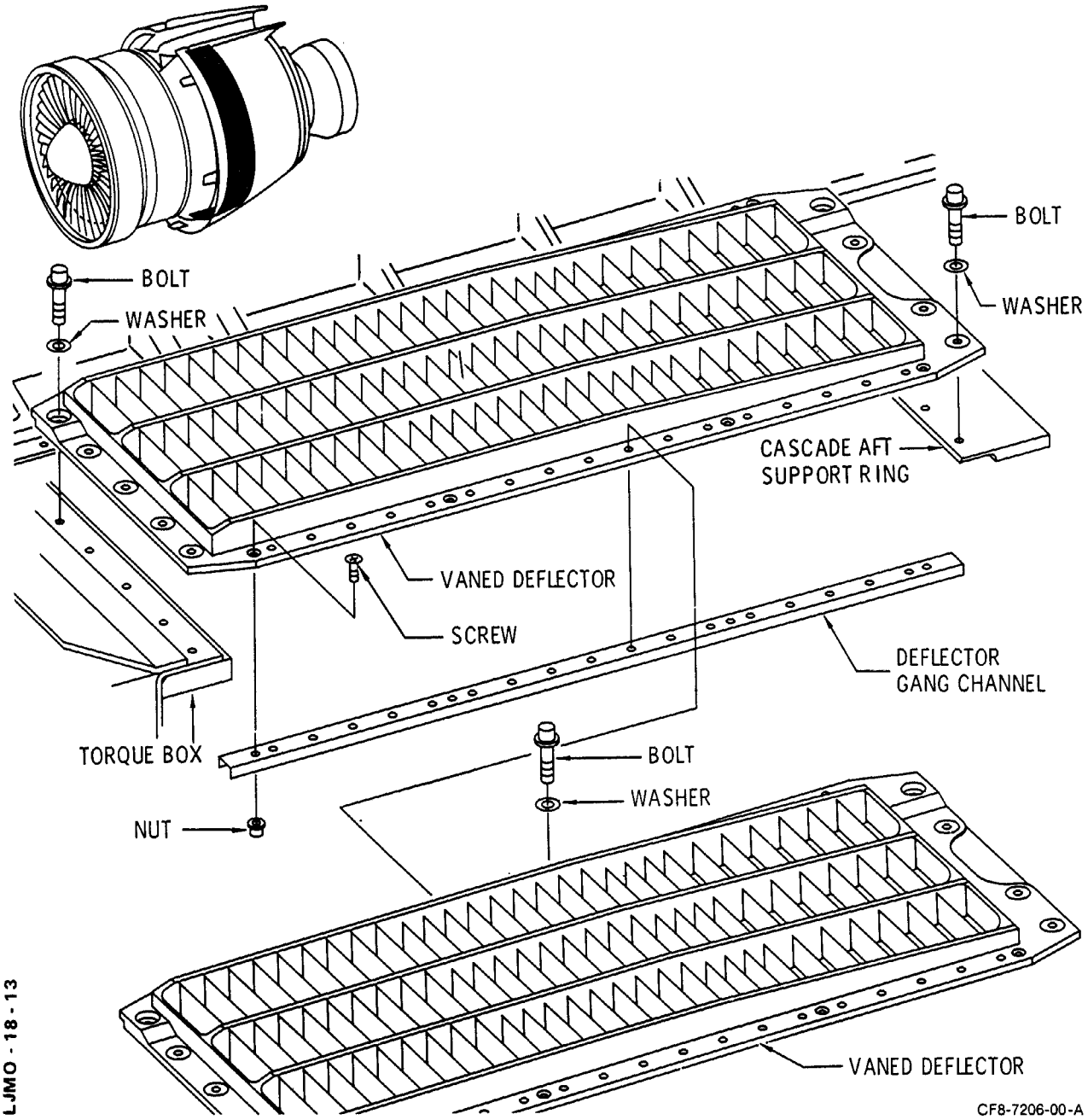
1 Remove nuts, washers, bolts and clamps securing latch ring cable to hold open rod upper support bracket.
2 Remove nuts, washers and bolts securing upper hold open rod support bracket to reverser structure.
3 Remove nuts, washers and bolts securing lower and upper hold open rod support bracket to reverser forward flange and remove assembly.

(b)Remove nuts, washers and bolts securing Mounting Ring Latch assembly to fan reverser half and remove assembly.
NOTE : Secure upper latch handle spring retainer to prevent ejection of spring when assembly is removed.

(3)Installation of Mounting Ring Latch Assembly.
(a)Position mounting ring latch assembly and install bolts, washers and nuts. Do not tighten nuts at this time.
NOTE : Install bolts with a wet layer of Epoxy Resin Primer (C03-002 or C03-005).
(b)Install reverser hold open rod as follows :
1 Install bolts, washers and nuts securing upper and lower hold open rod brackets to reverser forward flange.
2 Install bolts, washers and nuts securing upper hold open rod support bracket to reverser bracket.
TORQUE nuts to between 24 and 27 lbf. in. (0.27 and 0.30 m.daN).
3 TORQUE nuts securing upper and lower hold open rod brackets to reverser forward flange to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN).
(c)Secure latch cable to upper hold open rod support bracket using clamps,bolts, washers and nuts. TORQUE to between 24 and 27 lbf. in. (0.27 and 0.30 m.daN):
(d)Rig mounting latch assembly (Ref. 71-13-08, P. Block 401).
(Pre SB GE 78-119)
(Post SB GE 78-119)

F. Replacement of Hold Open Rod. (Ref. Fig. 814)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser - hold open rod.
(a)Release hinged loop-clamp securing hold open rod to support bracket.
(b)Remove hold open rod from reverser half by removing nut, bolt and 2 washers.
(3)Installation of fan reverser - hold open rod.
(a)Secure hold open rod to fan reverser half with bolt, 2 washers and nut. TORQUE self-locking nut to between 190 and 230 lbf. in. (2.15 and 2.61 m.daN).
(b)Insert hold open rod into hinged loop clamp and secure clamp.

G. Replacement of Link Arm. (Ref. Fig. 815)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser - link arm.
(a)Remove link arm from blocker door. (Ref. Paragraph 3.G.).
(b)Remove MA25S insulation material from the link support edges and the six nuts.
(c)Remove nuts, washers and pins securing link support bracket to reverser core cowl.



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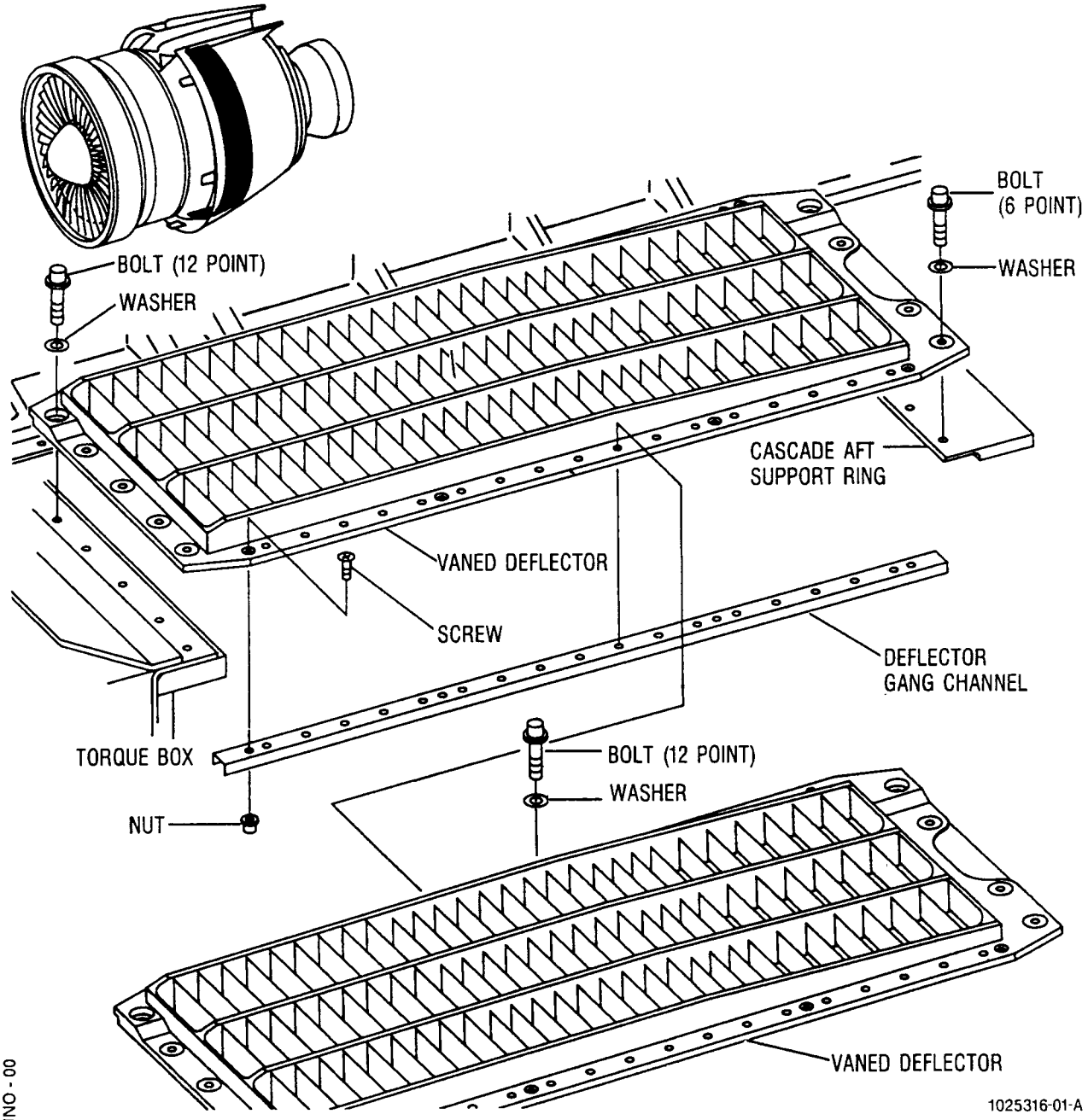
Vaned Deflector Removal/Installation
Figure 810



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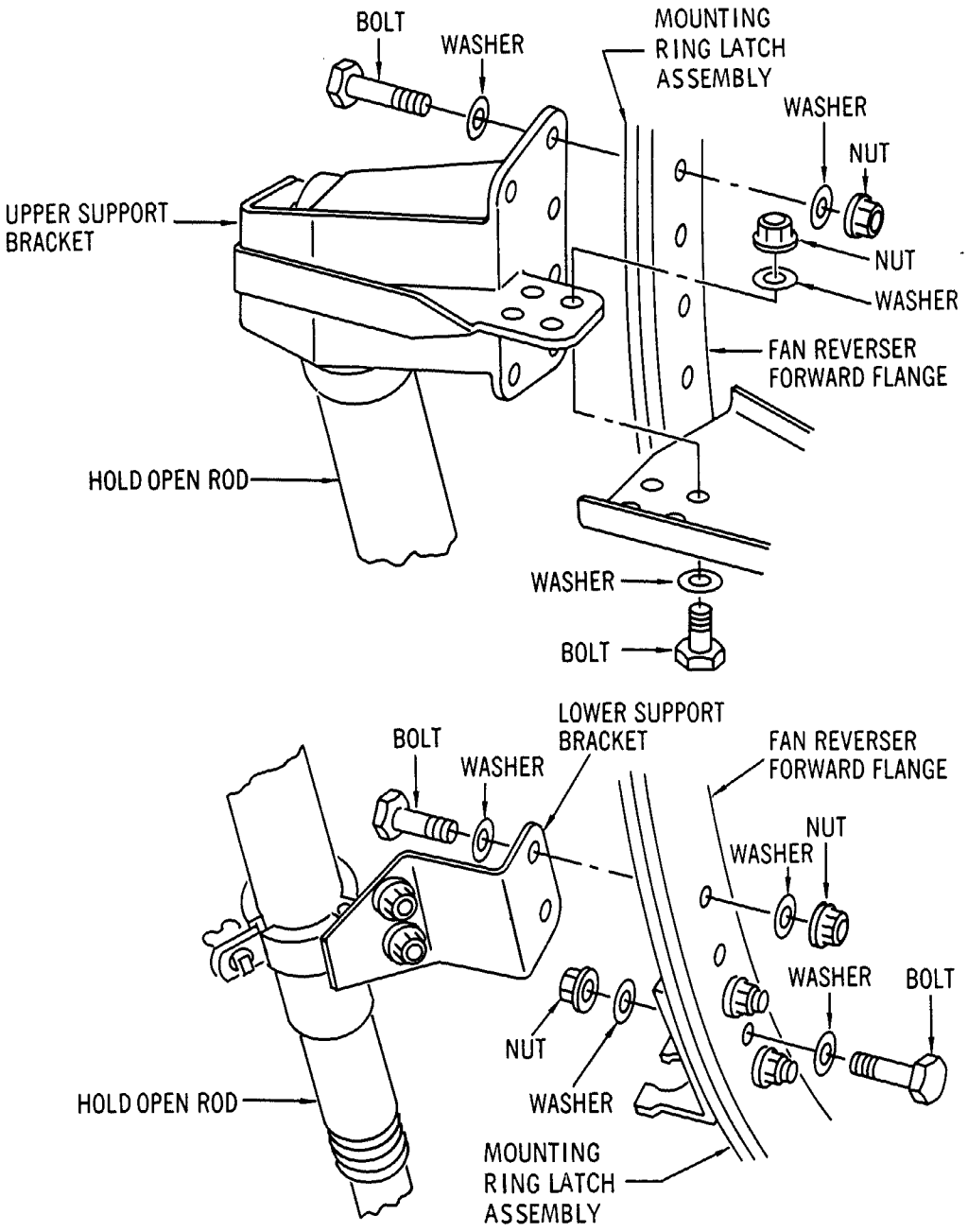
Vaned Deflector Removal/Installation
Figure 811



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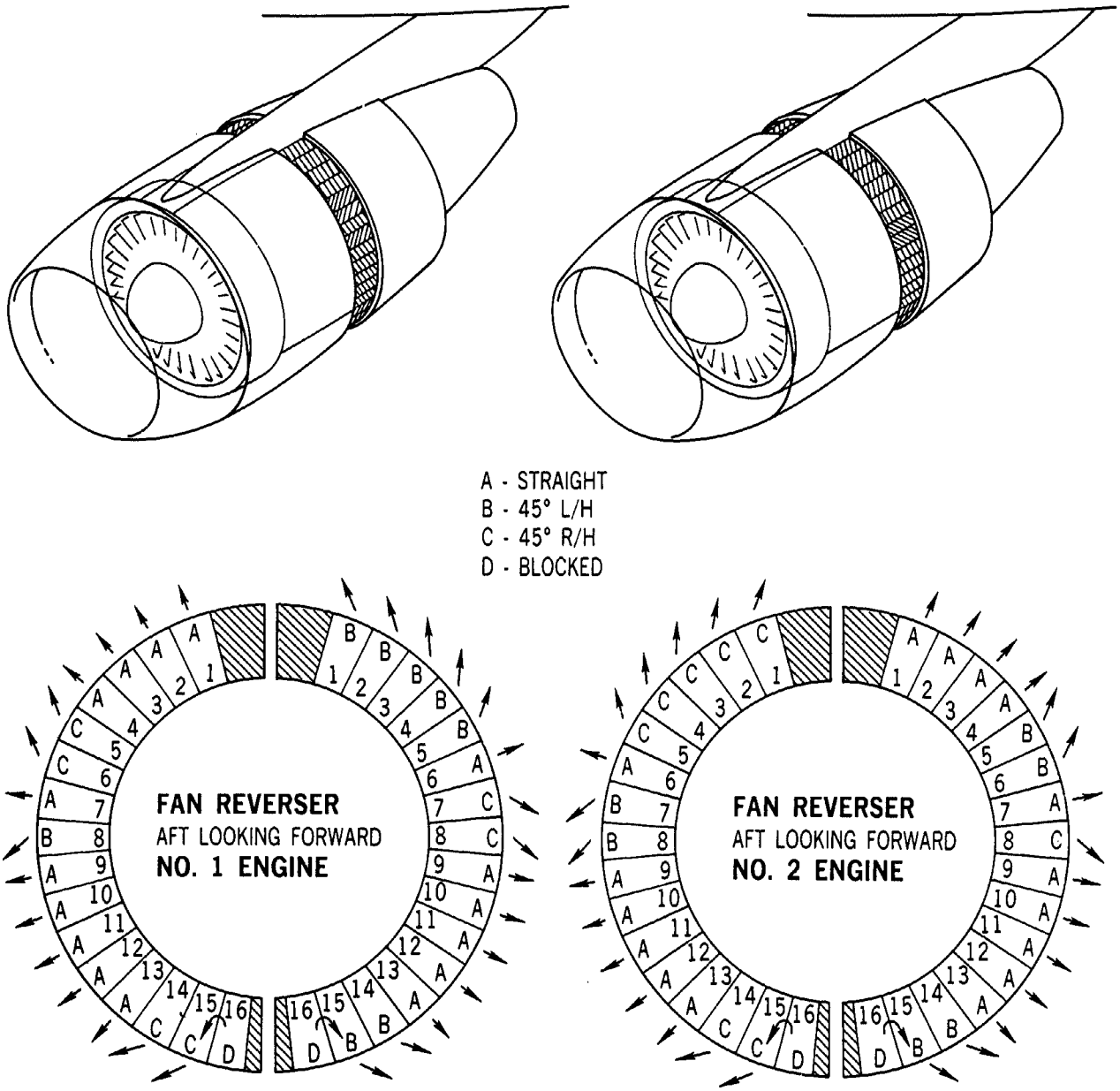
Mounting Ring Latch Assembly - Approved Repairs
Figure 812



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Fan Reverser Deflector Patterns
Figure 813

(d)Pull link support bracket and link arm through bottom of core cowl to gain access to link arm attach bolt. Remove lockwire, bolt, washer and link pin.

(3)Installation of fan reverser - link arm.

(a)Secure link arm to core cowl support bracket using link pin, washer and bolt. TORQUE to between 33 and 37 lbf. in. (0.37 and 0.42 m.daN). Wirelock.

(b)Apply Material No.C01-115 to the inner surface of the link support before installation to prevent aerodynamic leakage.

(c)Insert link arm and support bracket into position through bottom of core cowl. Secure with pins, washers and nuts. TORQUE to between 33 and 37 lbf. in. (0.37 and 0.42 m.daN).

(d)Apply Material C01-007 to the edges of the link support and the nuts of the link support.

(e)Secure link arm to blocker door. (Ref. Paragraph 3.G.).

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H. Replacement of Blocker Doors. (Ref. Fig. 816)

(1)Removal of fan reverser - blocker doors.

(a)Gain access to blocker door attach points by performing the following.

1 For reversers with a third line of defense (TLOD) brake, manually release the TLOD brake.
- Push in the two buttons on the TLOD brake manual release lever.
- Pull the release lever up and away from the TLOD brake until the two buttons click into position and you can see the green stripes on the buttons.

2 Release center drive unit (CDU) brake by pulling handle out, away from CDU (approximately 60°) until a flat is felt.

3 Remove two bolts securing lockout plate (on CDU) and remove plate.

4 Install a 0.25 in. (6.4 mm) square drive handle into the auxiliary drive pad. Crank reverser toward deploy far enough to gain access to back of blocker door.

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/ EQUIPMENT.

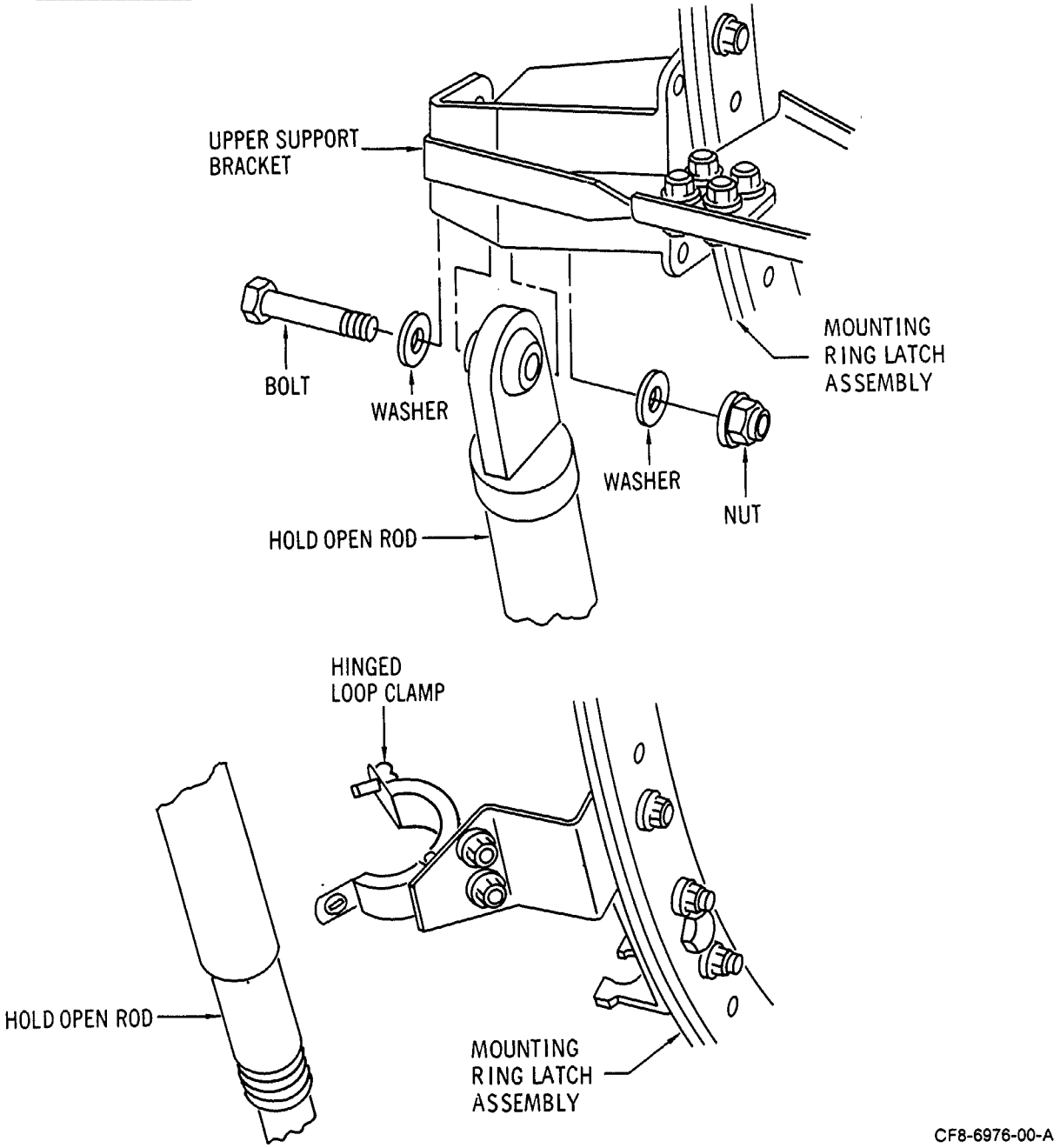
5 Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(b)Disconnect the link assembly from the blocker door by removing the two screws securing the spring loaded cover plate to the blocker door.

(c)Remove the link arm attach bolt by pushing the blocker door forward over the link arm. Remove the cotter pin, nut, washer and bolt.

Post SB GE 78-044

(d)At blocker door hinge joint, remove nut, washer, and screw securing anti-rotation clips: Remove anti-rotation clips.



BM5 78 32 00 8 LNMO - 18 - 13
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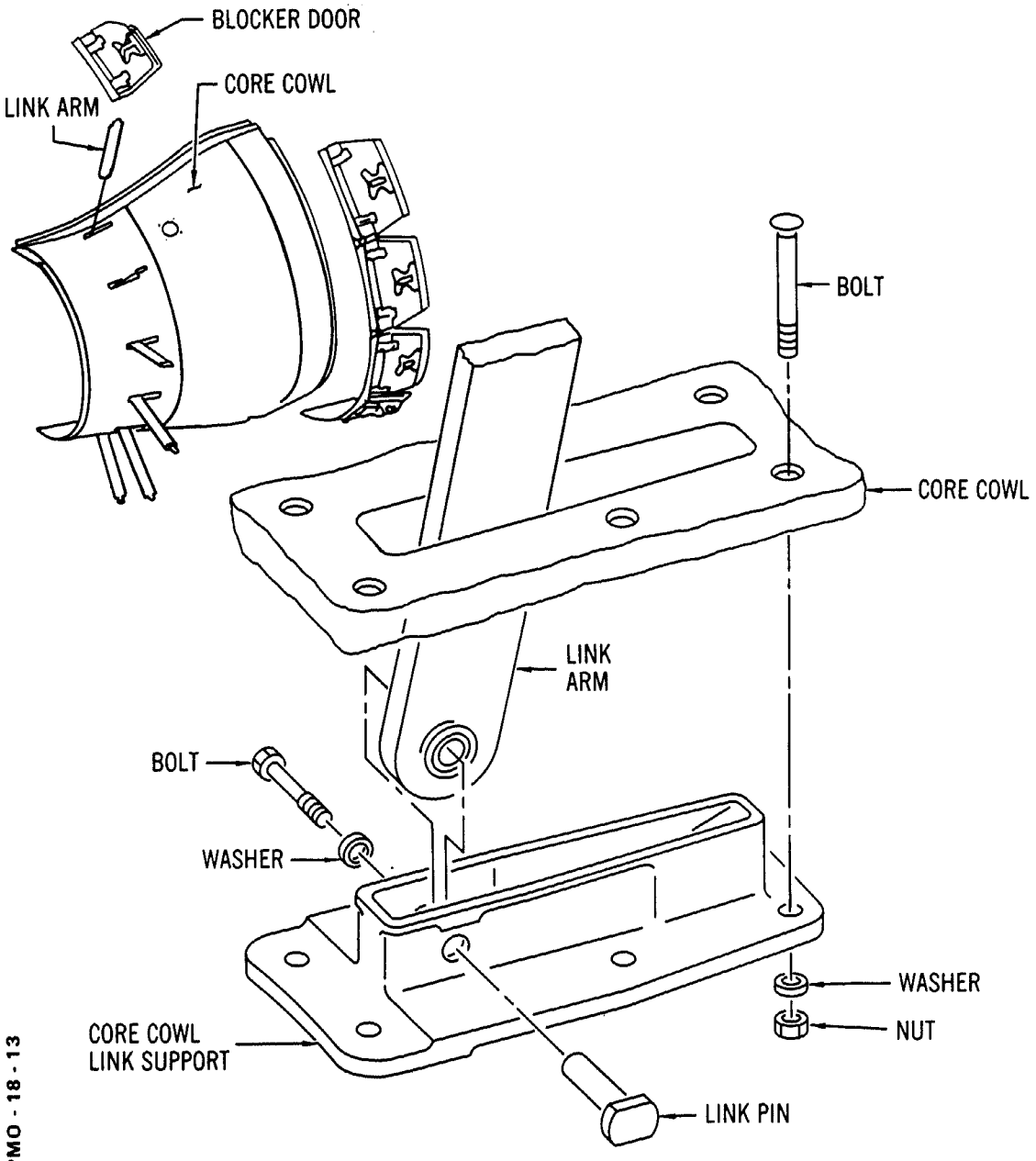
Hold Open Rod - Approved Repairs
Figure 814



Link Arm - Approved Repairs
Figure 815

(Ref. Fig. 816) (Sheet 2)

End Post SB GE 78-044

Post SB GE 78-144

(e)Remove nuts and washers from bolts.

(f)Remove bolts from anti-rotation clips. Proceed to step (h).

End Post SB GE 78-144

(g)Remove cotter pins, nuts, washers (if installed), and bolts securing blocker door hinges to reverser hinge clevis. If installed, note number and location of washers for ease of reinstallation.

(h)Remove the blocker door bushings and sleeves.

NOTE : Replace the blocker door if the inner diameter of the hinge is more than 0.5010 in. (12.725 mm).

1 Remove the bushings from the hinge.

2 Lightly hit the pressed sleeves with a non-metallic drift to remove them from the hinge. Be careful not to do damage to the hinge or make the hole larger.

CAUTION : MAKE CERTAIN TO INSTALL THE WEAR SLEEVES WHILE THE PRIMER IS WET.

CAUTION : MAKE CERTAIN THE BLOCKER DOOR HINGE LUGS ARE TIGHTLY HELD DURING THE INSTALLATION OF THE WEAR SLEEVE. THIS WILL PREVENT THE SLEEVE FROM UNWANTED MOVEMENT DURING INSTALLATION.

3 Apply a layer of zinc-chromate primer (C03-001) to the inner diameter of the hinge.

4 Press fit the wear sleeves into the blocker door hinge.

5 Install the sleeve bushings into the steel wear sleeves.

(2)Installation of fan reverser - blocker doors.

CAUTION : AFTER TIGHTENING NUT SECURING BLOCKER DOOR HINGE TO REVERSER CLEVIS, MAKE SURE DOOR HINGE BUSHINGS HAVE PRESSURE ON REVERSER CLEVIS BEARING. FAILURE TO DO SO WILL CAUSE EXCESSIVE MOVEMENT OF BEARING AND PREMATURE FAILURE OF BEARING AND BOLT.

Pre SB GE 78-144

(a)Position blocker door hinges over reverser hinge fitting and secure with bolts, washers (if used) and nuts removed in step (1) (e) and (g). TORQUE the nuts to a minimum of 55 lbf.in. (0.62 m.daN).

NOTE : The sleeves should slide to the uniball ball and make intimate contact, thus clamping it between the sleeves. If sleeves do not slide, free up sleeves using fibre mallet impact or a clamp.

(b)Check alignment of cotter pin hole in bolt within slot of castellated nut. If hole is above top of nut, remove nut and add up to two washers in any combination with the exception of two thick washers. Reinstall nut.

CAUTION : UNDER NO CIRCUMSTANCE SHOULD THE CASTELLATED NUT BE BACKED OFF TO INSTALL COTTER PIN.

(c)TORQUE nut to a minimum of 55 lbf.in. (0.62 m.daN) and install cotter pin. If cotter pin hole does not align within slot of castellated nut, continue to tighten nut until alignment occurs. Do not exceed 120 lbf.in. (1.36 m.daN). Apply a small amount of Material No.C01-007 to both ends of cotter pin to secure pin to nut.

NOTE : For blocker doors with general electric SB 78-044, make certain one point of the bolthead is in the 12 o'clock position. Subsequently, this will ease the installation of the anti-rotation

clip.

End Pre SB GE 78-144

Post SB GE 78-144

(a)Position the blocker door hinges over the reverser hinge fitting and secure with bolts, washers and nuts removed in steps (1)(e) and (f). TORQUE the nuts to between 90 and 110 lbf.in. (1.02 and 1.24 m.daN).

NOTE : The sleeves should slide to the uniball ball and make intimate contact, thus clamping it between the sleeves. If sleeves do not slide, free up sleeves using fibre mallet impact or a clamp.

(b)Not applicable.

(c)Not applicable.

End Post SB GE 78-144

Pre GE SB 78-044***

(d)Clean bolt heads and blocker door hinge clevis fittings with isopropyl alcohol (C04-035) or trichloroethane (C04-030).

CAUTION : APPLY AMPLE AMOUNT OF RTV TO BOLT HEADS AND BLOCKER DOOR HINGE CLEVIS FITTINGS TO PREVENT BOLT ROTATION.

(e)Apply RTV (C01-007) to bolt heads and blocker door hinge clevis fittings. (Ref. Fig. 816) (Sheet 2).

End Pre GE SB 78-044

Post GE SB 78-044***

(e)Install anti-rotation clip over bolthead. Apply a thin layer of Material No.C03-002 or Material No.C03-005 and secure with screw, washer, and nut (two places). TORQUE nuts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(Ref. Fig. 816) (Sheet 2)

End Post GE SB 78-044***

(f)Insert link arm into opening in blocker door. Apply RTV (C01-007) under bolt head and nut.
Secure arm to link assembly block with bolt and nut. TORQUE nut to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN). Secure with cotter pin.

(g)Apply lubricant (C02-004) to link support/link block interface surface.

(h)Apply RTV (C01-007) on each end of cotter pin.

NOTE : Cotter pin and RTV must not extend beyond edge of link assembly block.

(i)Position spring retainer cap assembly over link block and secure to blocker door with washers and screws. TORQUE to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

(3)Manually stow reverser as follows :

(a)Remove two bolts securing lockout plate (on CDU) and remove plate.

(b)Install a 0.25 in. (6.35 mm) square drive handle into the auxiliary drive pad and crank the reverser toward the stowed position.

CAUTION : MAKE CERTAIN THE LOCKOUT PLATE SQUARE DRIVE IS VISIBLE WHEN THE PLATE IS INSTALLED ON THE CDU DRIVE PAD. THE THRUST REVERSER HALF WILL FAIL TO OPERATE IF THE PLATE IS IMPROPERLY INSTALLED.

(c)Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(d)Engage the manual brake release lever on the CDU into its retaining clip. This will engage the CDU brake.
(e)For reversers with a third line of defense (TLOD) brake, manually engage the TLOD brake.
- Push in the two buttons on the TLOD brake manual release lever.
- Push the release lever down and toward the TLOD brake until the two buttons click into position and you can see the green stripes on the buttons.

**ON A/C 001-100,

POST SB MR 78-1034

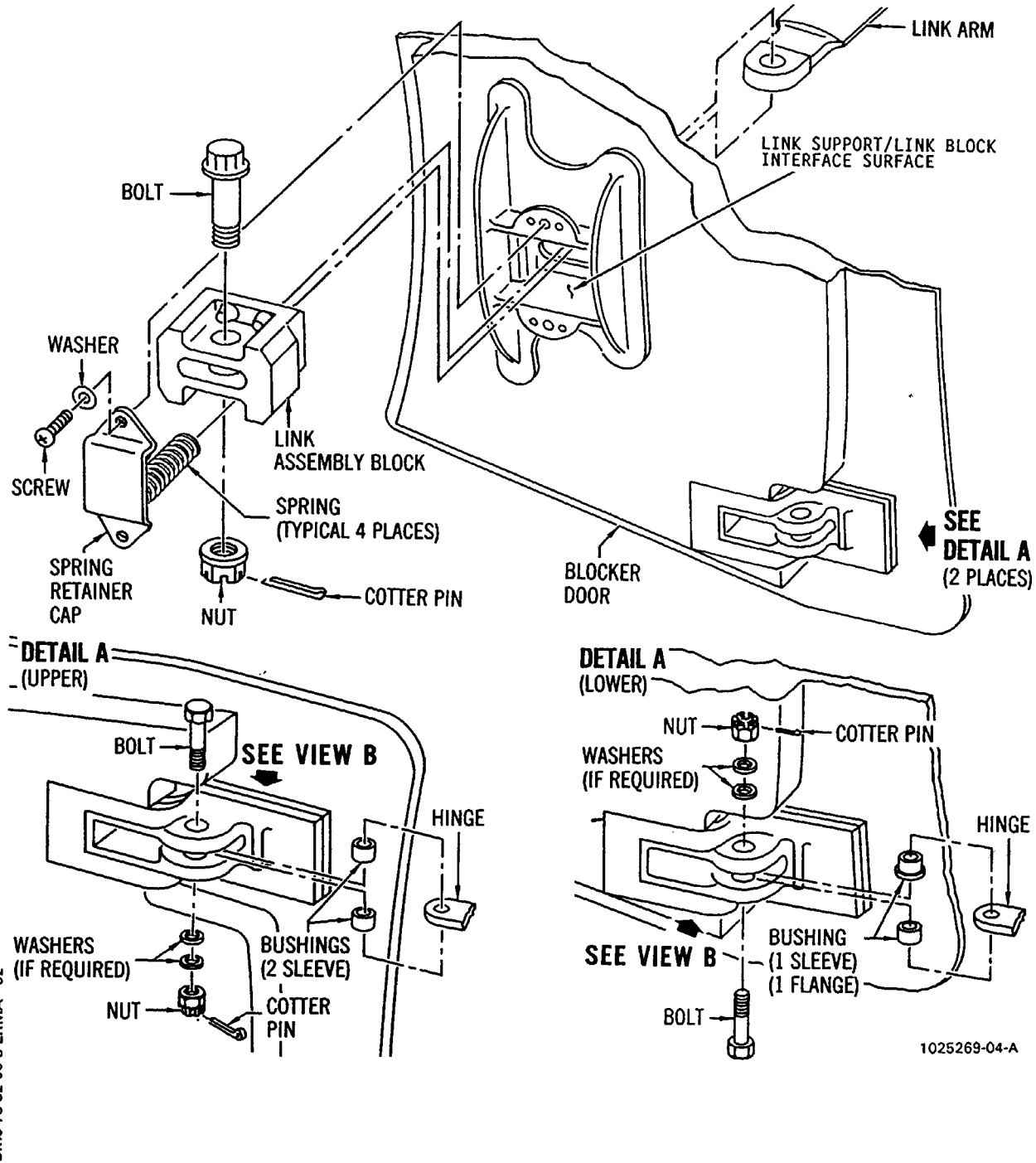
J. Replacement of the Blocker Door Bolt - On Hinges (Ref. Fig. 817)
(1)Tools equipment and materials

ITEM	DESIGNATION
A.	Shim, Laminated
B.	Nut, Self-Locking (J149P05)

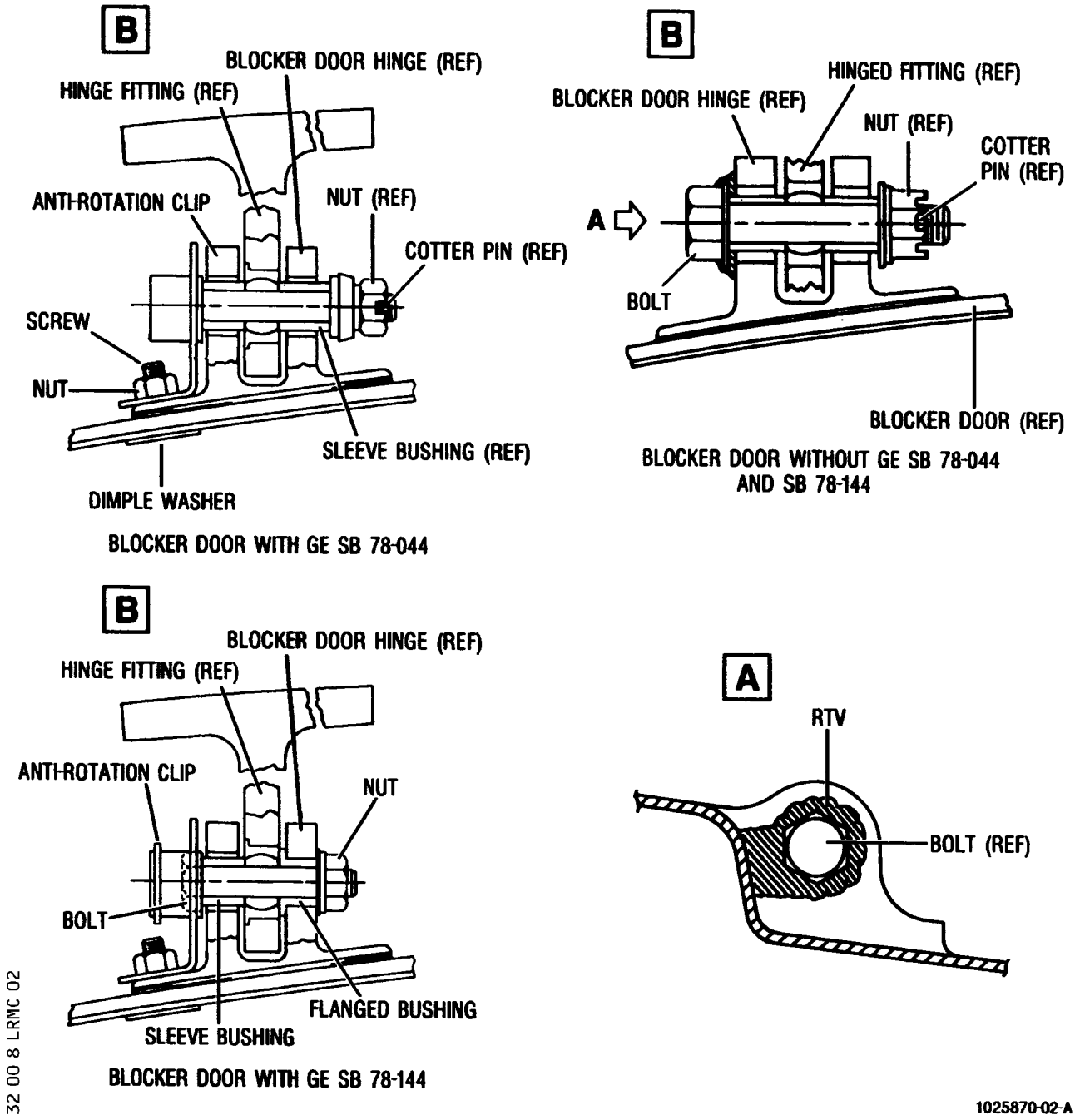
NOTE : Equivalent substitutes may be used instead of the above items. Laminated shim (491B1361018-001) may be manufactured by Middle River Aircraft Systems 103 Chesapeake Park Plaza - Baltimore - MD 21220.

(2)Removal of the blocker door bolt - on hinge
(a)Remove the nuts, washers and bolts that attach the hinge to the blocker door.
(b)Keep the bolts and washers for use during installation. Discard the nuts.
(c)If a laminated shim is installed, remove it. If there is no laminated shim installed go to step (4)(b).
(d)Measure the thickness of the laminated shim.
(3)Make a new laminated shim with the same thickness as the one removed in step (2)(c). Discard the removed shim.
(4)Install the blocker door bolt - on hinge.
(a)Attach the laminated shim to the bottom of the lower pad on the new hinge assembly.
(b)Install the hinge assembly with the washers and bolts removed in step (2)(a) and four new self-locking nuts.
(c)TORQUE the nuts to between 25 and 30 lbf.in. (0.28 and 0.34 m.daN).
END POST SB MR 78-1034

K. Replacement of Actuator Mount Brackets. (Ref. Fig. 818).
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser - actuator mount brackets.
(a)Remove actuator - angle gearbox (Ref. 78-31-03, P. Block 401).
(b)Remove nuts, washers and bolts securing actuator mount bracket to reverser forward flange. Remove bracket.
(3)Installation of fan reverser - actuator mount brackets.



Blocker Door - Approved Repairs (Sheet 1/2)
Figure 816



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Blocker Door - Approved Repairs (Sheet 2/2)
Figure 816

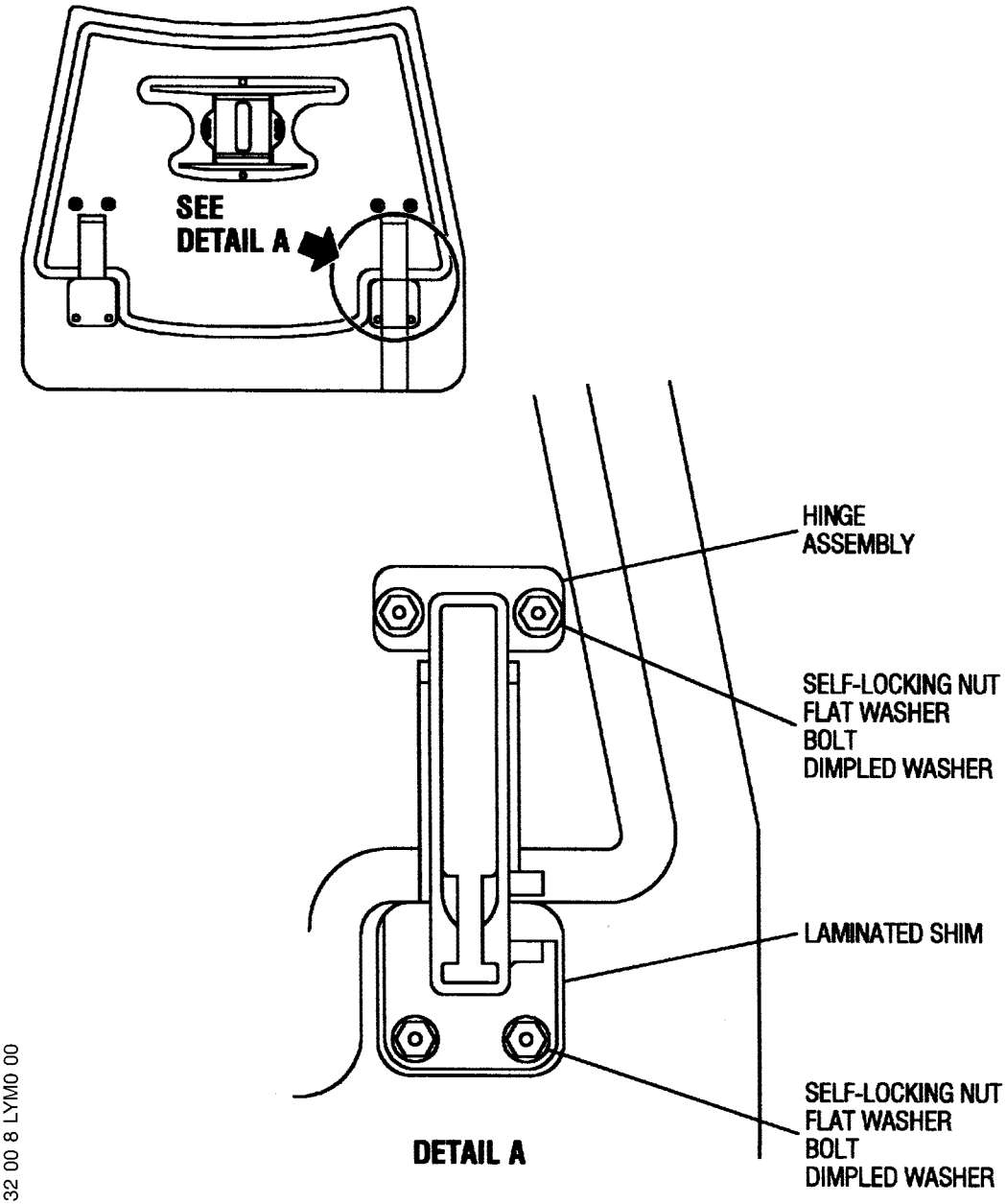
(a)Position mount bracket on reverser flange and secure with bolts, washers and nuts. TORQUE to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN).
(b)Install actuator - angle gearbox (Ref. 78-31-03, P. Block 401).

L. Replacement of Blowout Door. (Ref. Fig. 819)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser blowout door.
(a)Remove nuts, washers and bolts securing cables to blowout door brakets. Retain for reuse.
(b)Remove nuts securing blowout door hinge to the fixed structure by using allen head wrench (inserted in screw shaft) to hold screw in place while removing nut.
(3)Installation of fan reverser blowout door.
(a)Position blowout door over screws on fixed structure and install nuts.
(b)TORQUE nuts (while holding screw shaft with an allen head wrench) to between 8 and 10 lbf. in. (0.09 and 0.11 m.daN).
(c)Insert door cables into angle brackets and secure with bolts, washers and nuts. TORQUE nuts to between 33 and 37 lbf. in. (0.37 and 0.42 m.daN).

M. Replacement of Blowout Door Cable. (Ref. Fig. 820, 819)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser blowout door cable.
CAUTION : MISLOCATING THE BLOWOUT DOOR CABLES MAY RESULT IN DAMAGE TO THE FAN REVERSER SHOULD THE DOOR OPEN IN FLIGHT.
(a)Remove nuts, washers and bolts securing door cable to blowout door and reverser brackets. Remove cable.
(3)Installation of fan reverser blowout door cable.
(a)Position door cable in blowout door and reverser bracket.
(b)Secure cable with bolts, washer and nuts. TORQUE to between 33 and 37 lbf. in. (0.37 and 0.42 m.daN).
NOTE : Blowout door cables are of two different lengths with the longest cable installed at the forward angle bracket attachment. In later model fan reversers, the color on the aft cable has been changed from yellow to green to prevent the possibility of cables being mislocated.

N. Replacement of Lower Latch Assembly. (Ref. Fig. 821)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser low latches.
(a)Remove nut and bolt securing latch support bracket and remove latch.
(3)Installation of fan reverser lower latches.
(a)Insert latch into support bracket. Secure with bolt and nut. TORQUE two forward latch bolts to between 250 and 300 lbf. in. (2.83 and 3.39 m.daN). TORQUE aft latch bolt to between 190 and 230 lbf. in. (2.15 and 2.60 m.daN).

P. Replacement of Lower Latch Pin. (Ref. Fig. 822)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser latch pins.



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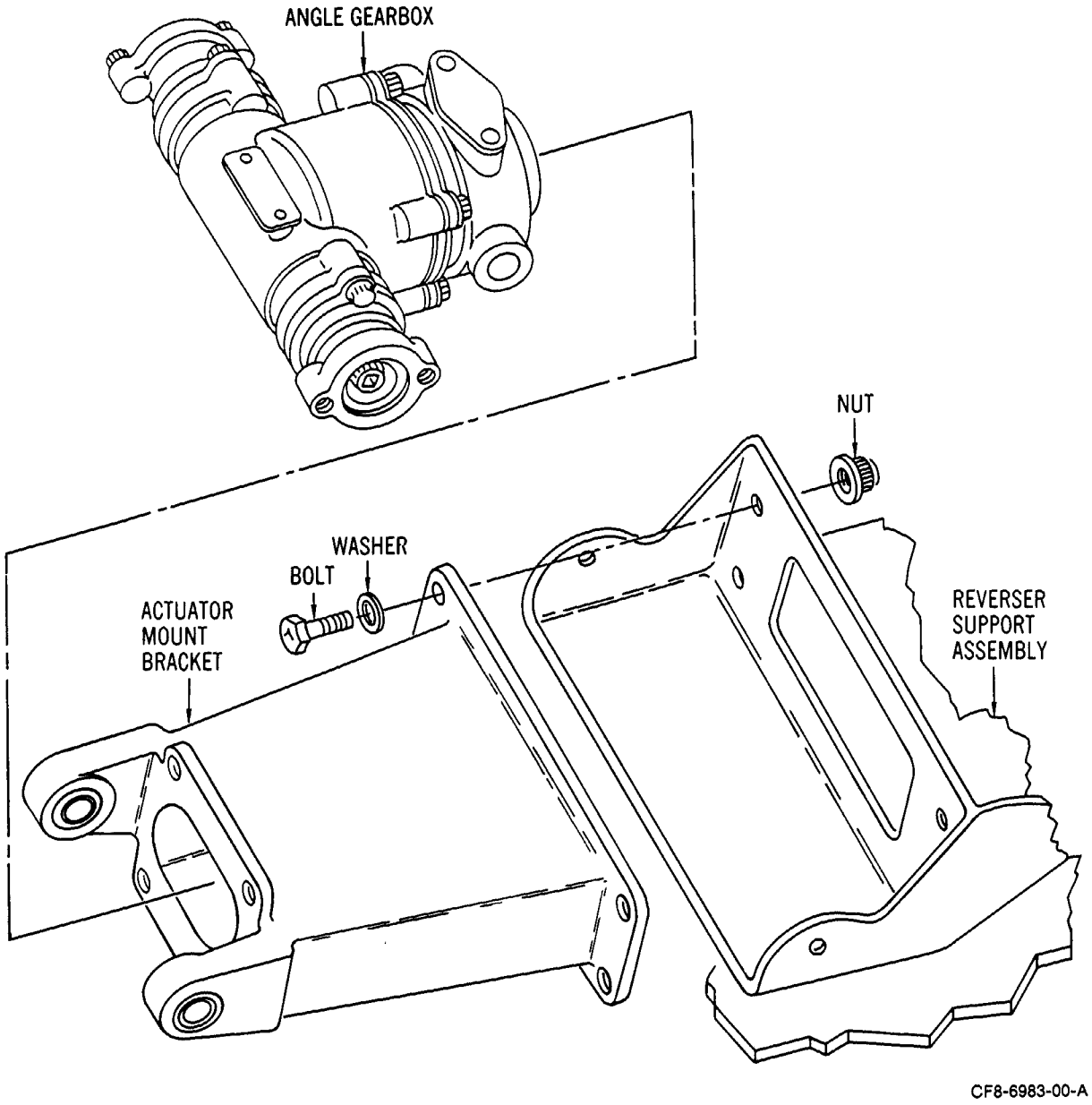
Blocker Door Bolt - On Hinge Replacement
(POST SB MR 78-1034)
Figure 817



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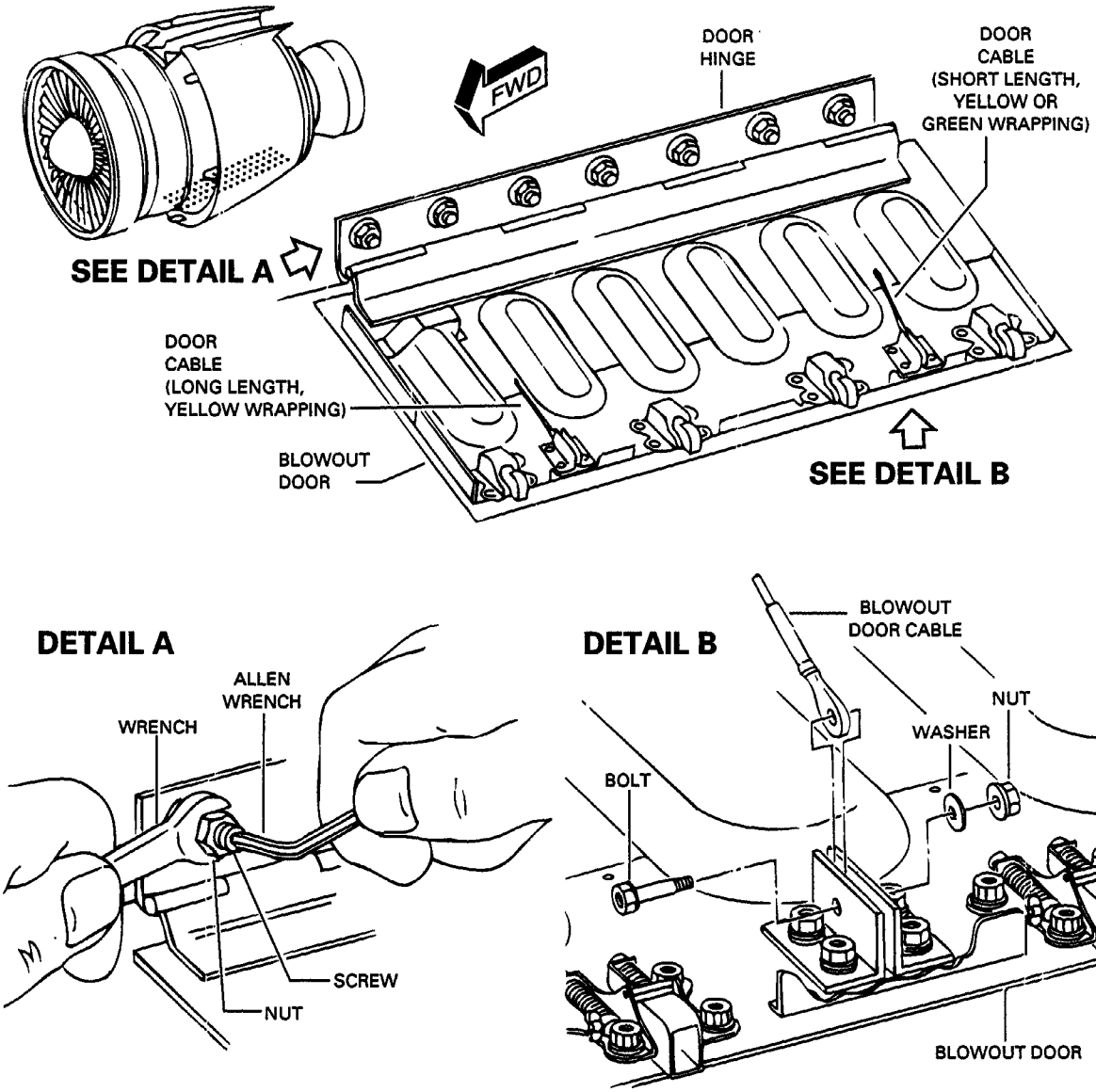
Actuator Mount Bracket - Approved Repairs
Figure 818



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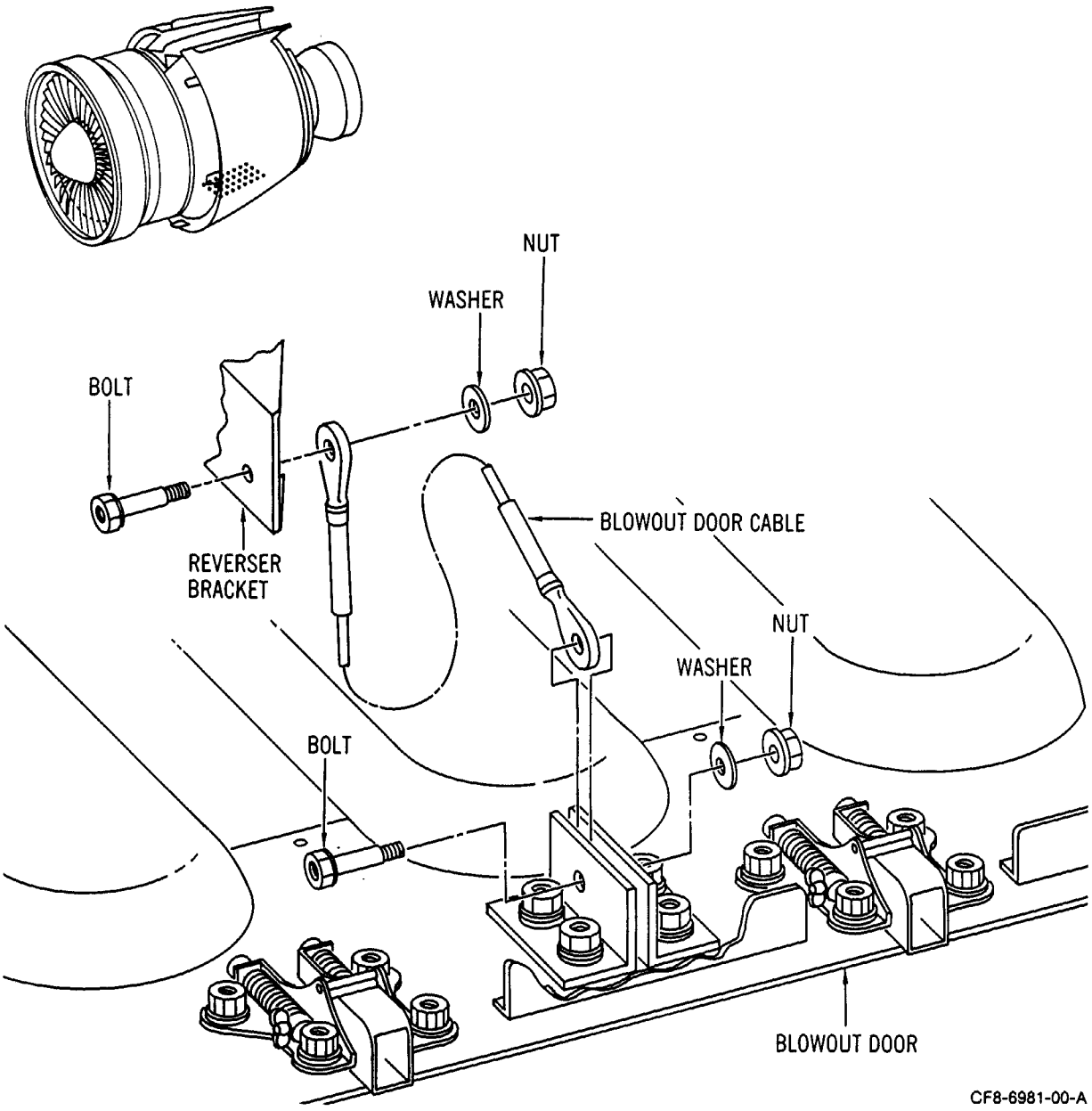
Blowout Door - Approved Repairs
Figure 819



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Blowout Door Cable - Approved Repairs
Figure 820

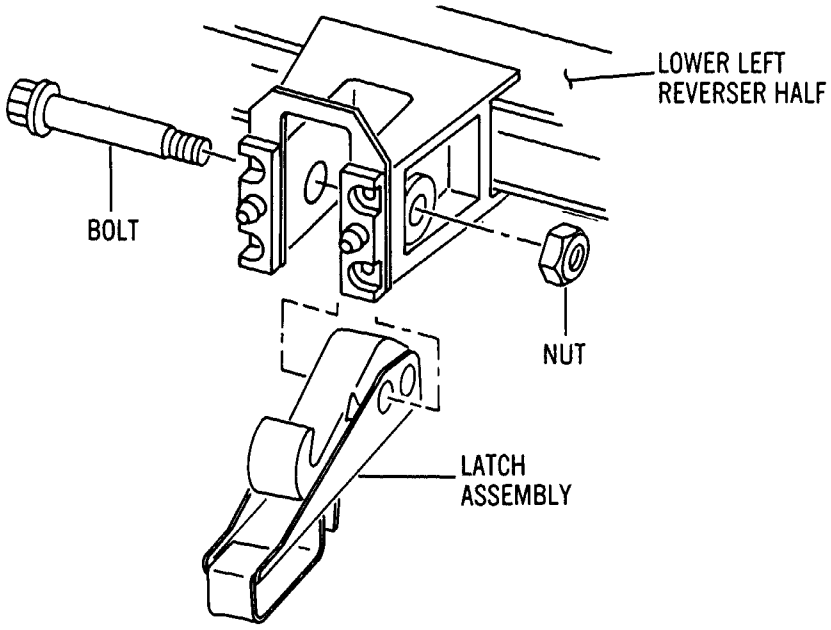
(a)Remove nut and pull pin from support bracket.
(3)Installation of fan reverser latch pins.
(a)Insert latch pin into support bracket and secure with nut. TORQUE two forward latch pin nuts to between 480 and 570 lbf. in. (5.42 and 6.44 m.daN). TORQUE aft latch pin nut to between 190 and 230 lbf. in. (2.15 and 2.60 m.daN).

Q. Replacement of Fan Reverser - Deflection Limiters. (Ref. Fig. 823)
(1)Tools, equipment and materials. None required.
(2)Removal of fan reverser - deflection limiters.
(a)Remove the nuts, bolts, washers and shims, or bolts, washers and shims as applicable, securing deflection limiters to the fan reverser and lower mounting brackets. Retain shims for reuse.
(3)Installation of fan reverser - deflection limiters.
(a)Secure deflection limiter and removed shims, to the fan reverser upper and lower mounting brackets using bolts, washers and nuts or, bolts and washers. TORQUE to between 24 and 27 lbf. in. (0.27 and 0.30 m.daN).
(b)Check deflection limiter gap (Ref. 71-13-03, P. Block 401).

R. Replacement of Fan Reverser - IDG Access Panel (Ref. Fig. 824)
(1)Tools, equipment and materials. None required.
(2)Removal of the IDG access panel
(a)Release the two latches and open the access panel.
(b)Remove the nuts, washers and screws securing the IDG access panel to the hinge.
(c)Remove the shim between the access panel and the hinge. Retain the shim for installation.
(d)Remove the access panel.
(3)Installation of the IDG access panel
(a)Secure the access panel to the latch beam assembly sidewall and close out structure. Place the shim between the hinge and the close out structure. Secure access panel using screw, washers and nuts.
(b)TORQUE nuts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(c)Close access panel and secure with latches.

POST GE SB 78-101 * * * (TRANSLATING COWLS WITH CAST ACTUATOR SUPPORT FITTINGS)

S. Repair of the Cast Actuator Support Fittings (Ref. Fig. 825)
(1)Open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Make sure the crack can be repaired (Ref. 78-32-00, P. Block 601).
(3)If the crack cannot be repaired, replace the thrust reverser half (Ref. 71-13-03, P. Block 401).
(4)If the crack can be repaired, do the repair procedure.
(a)Stop drill the end of the crack.
(b)Fabricate doubler(s) as needed from 301 1/2H 0.040 in. (1.02 mm) or 0.050 in. (1.27 mm) thick stainless.
1 Cut to fit and shape one doubler for installation on the inside of the fitting webs as shown in (Ref. Fig. 825).
2 Cut to fit and shape doubler(s) for installation on the outside of the fitting web(s) as shown in (Ref. Fig. 825).
(c)Remove the fasteners that are between the support assembly bulkhead



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BM5 78 32 00 8 LZMO - 18 - 13
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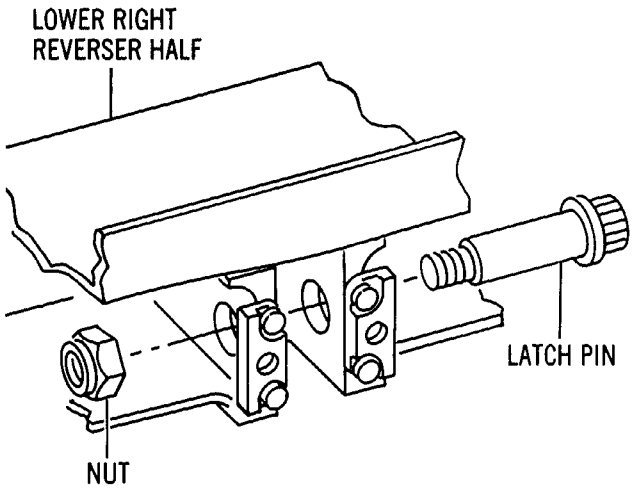
Lower Latch Assembly - Approved Repairs
Figure 821



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BM5 78 32 00 8 LBMO - 18 - 13
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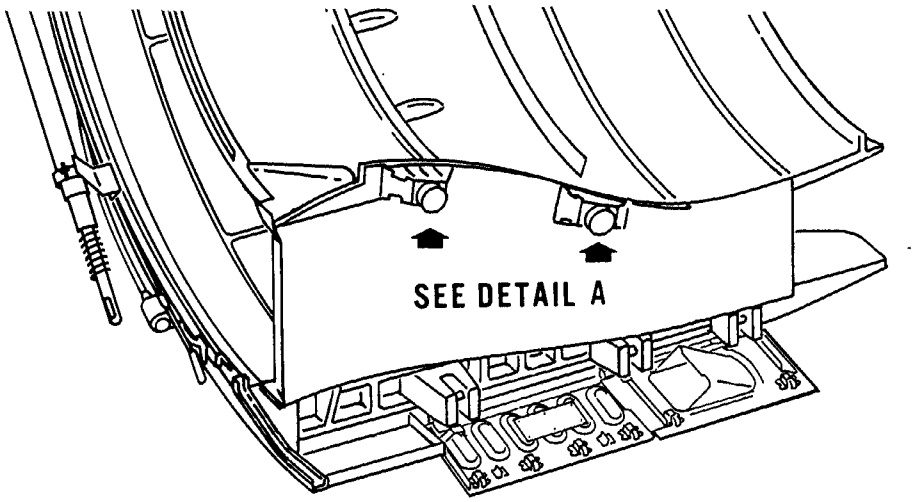
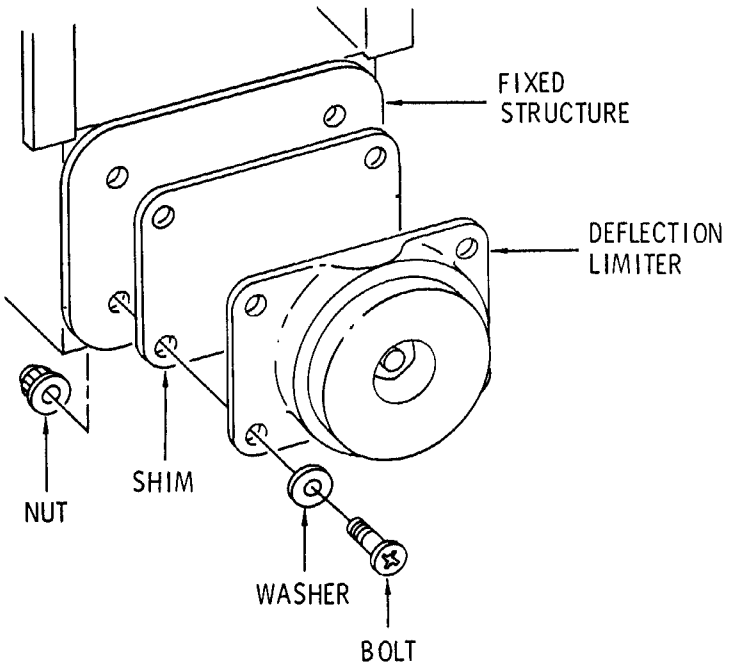
Lower Latch Pin - Approved Repairs
Figure 822



DETAIL A



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BM5 78 32 00 8 LDMO - 18 - 13
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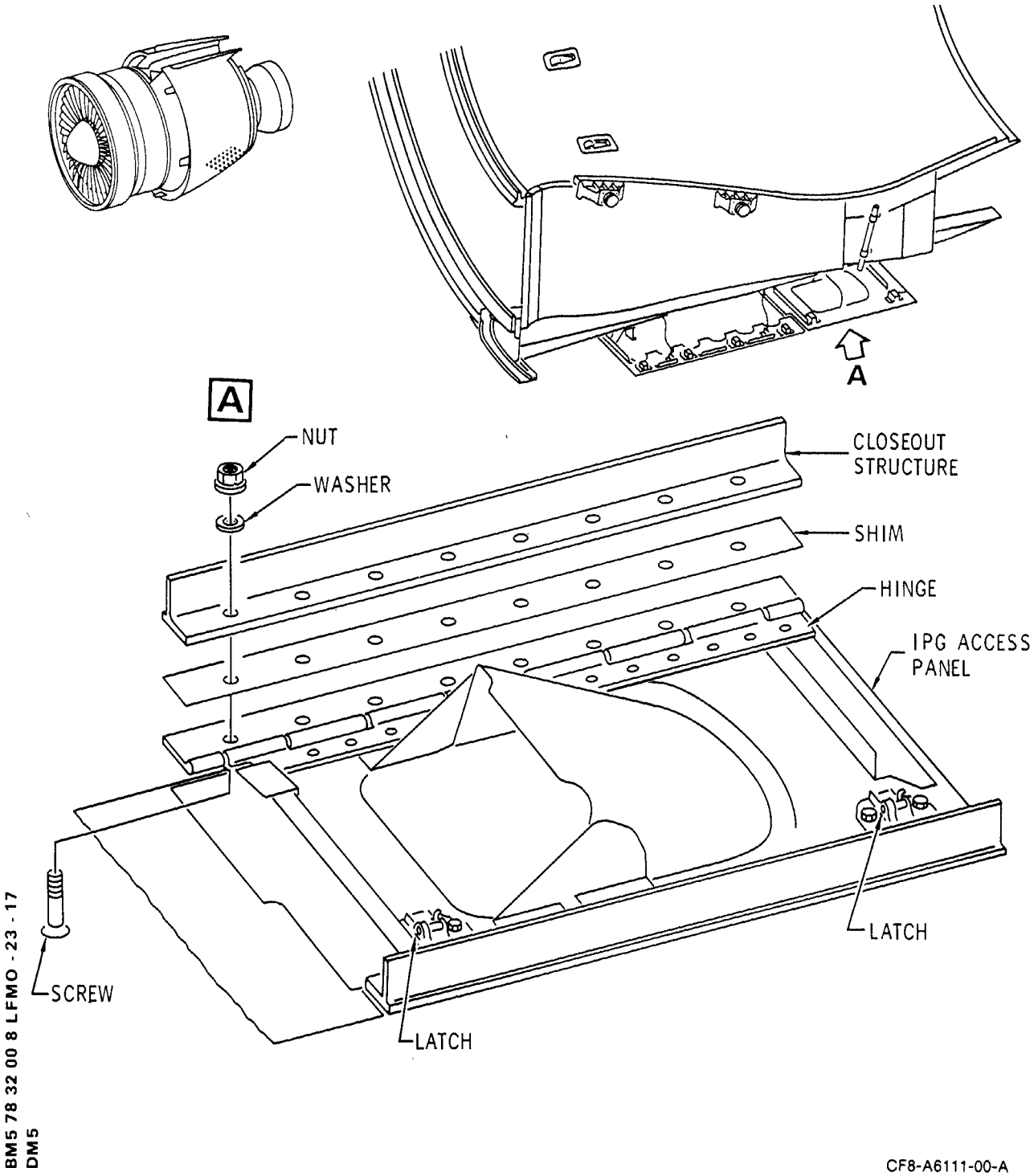
Deflection Limiters - Approved Repairs
Figure 823



IDG Access Panel
Figure 824

and the fitting.

(d)Clamp the doublers in place and backdrill the fastener holes as required. Drill additional fastener holes through the fitting web(s) and the doublers.

NOTE : Make sure the standard space between rivets is followed.

(e)Apply Material No.C03-006 to the bare metal on the fitting.

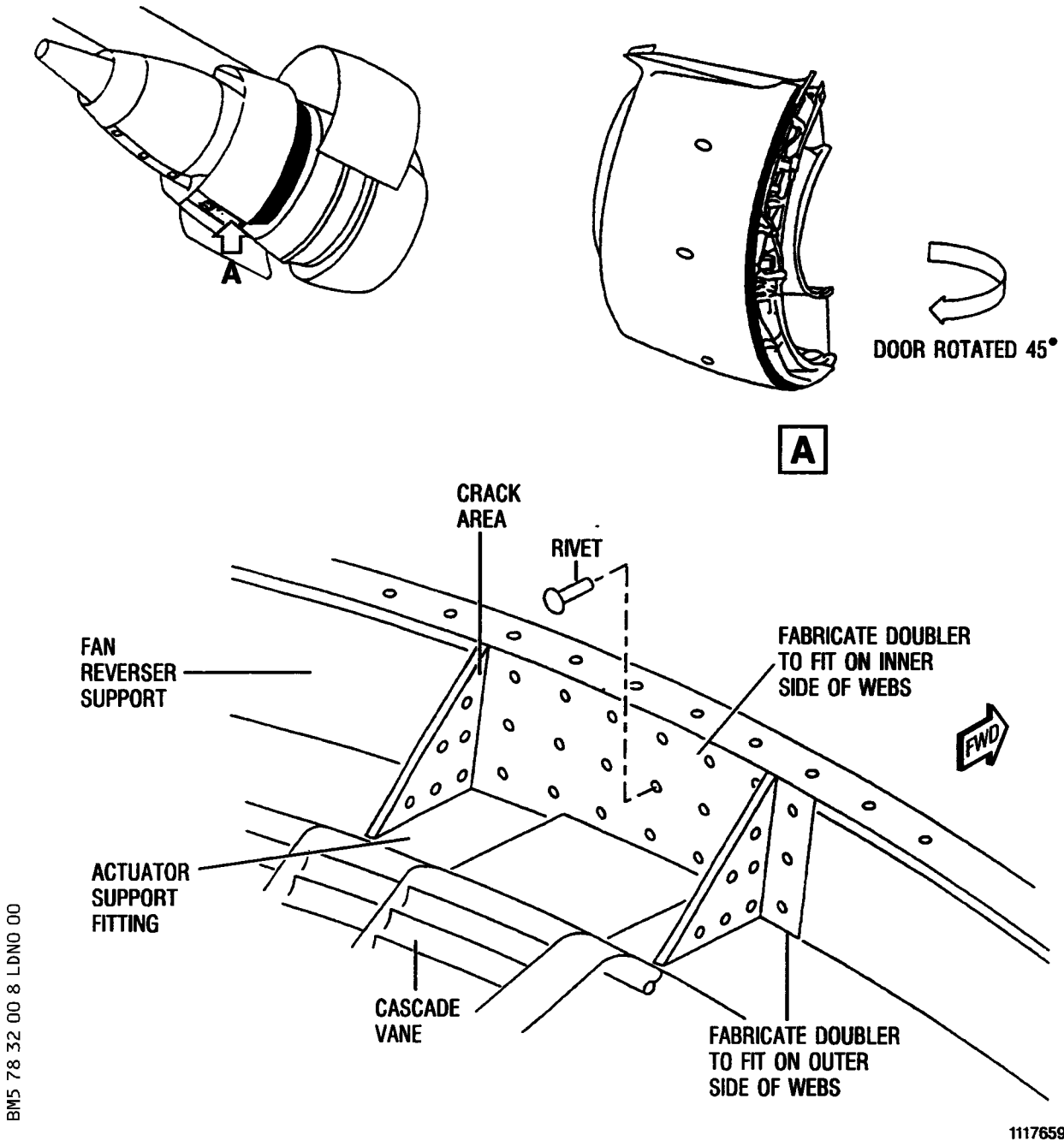
(f)Apply Material No.C03-005 to the fitting and the doublers.

(g)Attach the doublers to the fitting with MS20470AD5 rivets.

(5)Make sure the work area is clean. Remove all the tools and equipment.

(6)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

END POST GE SB 78-101



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Cast Actuator Support Fitting
Figure 825

T. Removal of Pie-Shaped Blocker Door Fairings (Ref. Fig. 827)
(1)Tools, equipment, and materials. None required.
(2)Manually deploy reverser as follows :
(a)Release center drive unit (CDU) brake by pulling handle out, away from CDU (approximately 60°) until a flat is felt.
(b)Remove two bolts securing lockout plate on CDU and remove plate.
(c)Install a 0.25 in. (6.4 mm) square drive handle into the auxiliary drive pad. Crank reverser toward deploy approximately to between 18 and 20 in. (457 and 508 mm).
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/ EQUIPMENT.
(d)Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(3)After removing blocker door (Ref. Para. 3.G.), remove pie-shaped blocker door fairings on each side of removed blocker door using one of the following methods.
(a)Rivet removal method.
1 Drill out five rivets securing fairing to inner bondment graphite C-ring. Retain five washers installed under fairing.
2 Drill out two rivets securing fairing to forward finger support angle.
3 Remove fairing from translating cowl assembly. Retain finger support bracket isolator.
(b)Cut-out method.
CAUTION : WHEN CUTTING FAIRING, CUT FAR ENOUGH AWAY FROM RIVETS TO ENSURE INNER BONDMENT GRAPHITE C-RING AND FORWARD FINGER SUPPORT ANGLE ARE NOT DAMAGED.
1 Cut through fairing just aft of rivets attaching fairing to forward finger support angle (Ref. Fig. 827).
2 Cut through fairing just forward of rivets attaching fairing to inner bondment graphite C-ring. Remove and discard cut out section of fairing (Ref. Fig. 827).
(4)Manually stow reverser as follows :
(a)Remove two bolts securing lockout plate (on CDU) and remove plate.
(b)Install a 0.25 in. (6.4 mm) square drive handle into the auxiliary drive pad and crank the reverser toward the stowed position.
CAUTION : MAKE CERTAIN THE LOCKOUT PLATE SQUARE DRIVE IS VISIBLE WHEN THE PLATE IS INSTALLED ON THE CDU DRIVE PAD. THE THRUST REVERSER HALF WILL FAIL TO OPERATE IF THE PLATE IS IMPROPERLY INSTALLED.
(c)Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

U. Replacement of the Translating Cowl Clevis Pin
(1)Equipment and Materials

ITEM	DESIGNATION
(a)2C6367	Pin Puller, Ballscrew Actuator
(b)Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(c)Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(d)Material No.C02-060	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)

(2)Removal of the translating cowl clevis pin.
(3)If the translating cowl clevis pin cannot be removed from the outer side of the translating cowl, use the following procedure to remove the clevis pin from the inner side of the translating cowl.
(Ref. Fig. 826)
(a)Get access to the inner side of the translating cowl.
(b)Remove the sealant and get access to the rod end bearing pin access cap at the ballscrew actuator.
(c)Remove the rod end bearing pin access cap.
(d)Remove the inner retainer.
(e)Use the pin install/remove tool 2C6367G01 to remove the clevis pin that attaches the ballscrew actuator to the translating cowl.
(4)Installation of the translating cowl clevis pin.
(5)If the clevis pin was removed from the inner surface of the translating cowl, install the clevis pin as follows (Ref. Fig. 826).
(a)Align the ballscrew rod end bolt hole with the translating cowl clevis bolt hole.
(b)Get access to the inner surface of the translating cowl. Install the clevis pin through the ballscrew rod end bolt hole and the clevis bolt hole.

WARNING : MATERIAL NO.C02-060 IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-060 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-060 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(c)Lubricate the threads of the inner retainer with Material No.C02-060.
(d)Install the inner retainer.

WARNING : MATERIAL NO.C02-060 IS AN AGENT THAT IS POISONOUS, CARCINOGENIC, AN ASPHYXIANT, AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-060 IS USED.
- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR

FLAME.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-060 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(e)Lubricate the threads of the rod end bearing pin access cap with Material No.C02-060.

(f)Install the rod end bearing pin access cap.

(g)TORQUE the rod end bearing pin access cap to between 76 and 100 lbf.in. (0.86 and 1.13 m.daN).

WARNING : MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(h)Apply Material No.C01-073 or Material No.C01-115 fully on the rod end bearing pin access cap.

Pre MRAS SB 78-1089

V. Removal/Installation of the Longeron Stud at the Actuator Clevis Fitting

(1)Tools, equipment, and materials. None required.

(2)Remove the longeron stud.

(a)Open, safety, and tag the applicable circuit breakers.

(b)Open the fan cowl doors (Ref. 71-13-00, P. Block 301).

(c)Get access to the applicable actuator access panel

(d)Remove the 10 screws from the access panel, and remove the access panel. Keep the screws for use at installation.

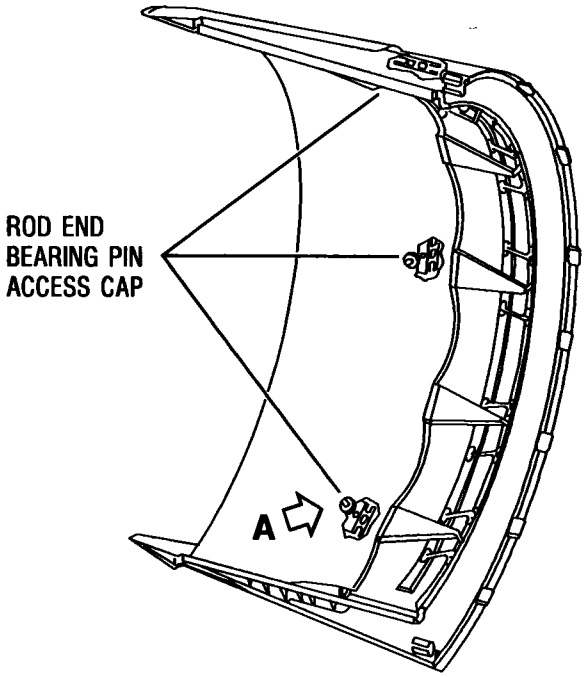
(e)Manually deploy the translating cowl approximately 10 in. (25.4 cm).

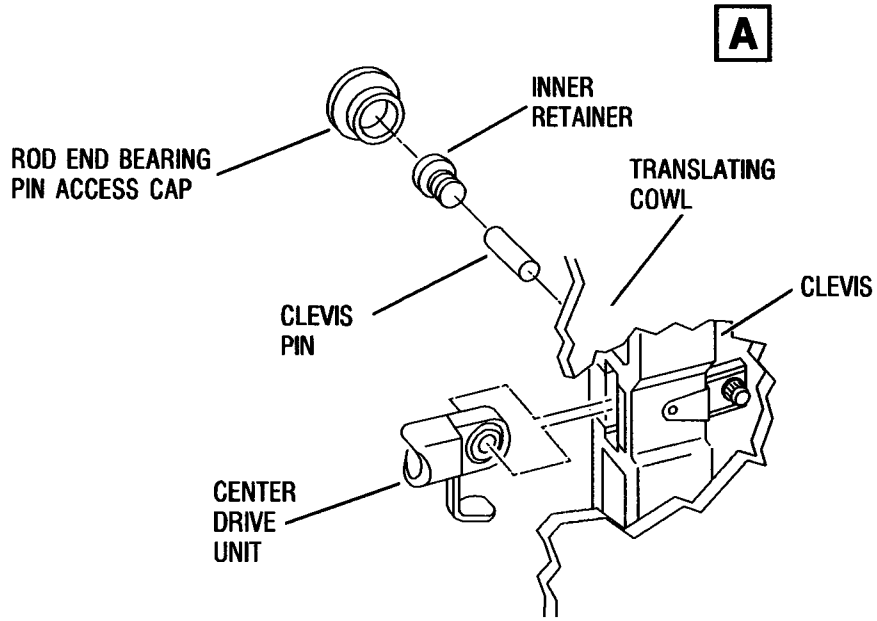
1 Pull the handle of the center drive unit (CDU) brake away from the CDU (approximately 60°) until you feel a flat.

2 Remove the two bolts that attach the lockout plate to the CDU, and remove the lockout plate.

3 Install a 0.25 in. (6.4 mm) square drive handle into the auxiliary drive pad. Crank the reverser in the deploy direction approximately 10 in. (25.4 cm).

4 Install the lockout plate square drive into the auxiliary drive





BM5 78 32 00 8 LFNO 00

Translating Cowl Clevis Pin
Figure 826

pad and install the two bolts you removed. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(f)Remove and discard the self-locking nut from the applicable actuator clevis fitting assembly.

(g)Remove the washer and the retaining clip.

1 For Grumman translating cowls, keep the washer and the retaining clip for use at installation.

2 For Martin Marietta translating cowls, discard the washer and keep the retaining clip.

(h)Remove and discard the longeron stud.

(3)Install the longeron stud.

(a)Install the new longeron stud.

(b)Install a new self-locking nut on the actuator clevis fitting assembly.

(c)Install the washer and the retaining clip.

1 For Grumman translating cowls, install the washer and the retaining clip that you removed.

2 For Martin Marietta translating cowls, install a new washer and the retaining clip that you removed.

(d)Manually stow the translating cowl.

1 Remove the bolts that attach the lockout plate to the CDU and remove the lockout plate.

2 Install a 0.25 in. (6.4 mm) square drive handle into the auxiliary drive pad and crank the reverser to the stowed position.

CAUTION : MAKE SURE YOU CAN SEE THE LOCKOUT PLATE SQUARE DRIVE WHEN YOU INSTALL THE PLATE ON THE CDU DRIVE PAD. THE THRUST REVERSER WILL FAIL TO OPERATE IF THE PLATE IS NOT INSTALLED CORRECTLY.

3 Install the lockout plate on the CDU in the position where you can see the square drive. Install the bolts that you removed. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

CAUTION : DO NOT TORQUE THE ACCESS PANEL SCREWS MORE THAN THE SPECIFIED TORQUE VALUE. TOO MUCH TORQUE ON THE SCREWS CAN CAUSE CRACKS IN THE ACCESS PANEL.

(e)Install the actuator access panel with the screws. TORQUE the screws to between 22 and 27 lbf.in. (0.24 and 0.30 m.daN).

(f)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

(g)Remove the safety clips and tags and close the applicable circuit breakers.

END Pre MRAS SB 78-1089

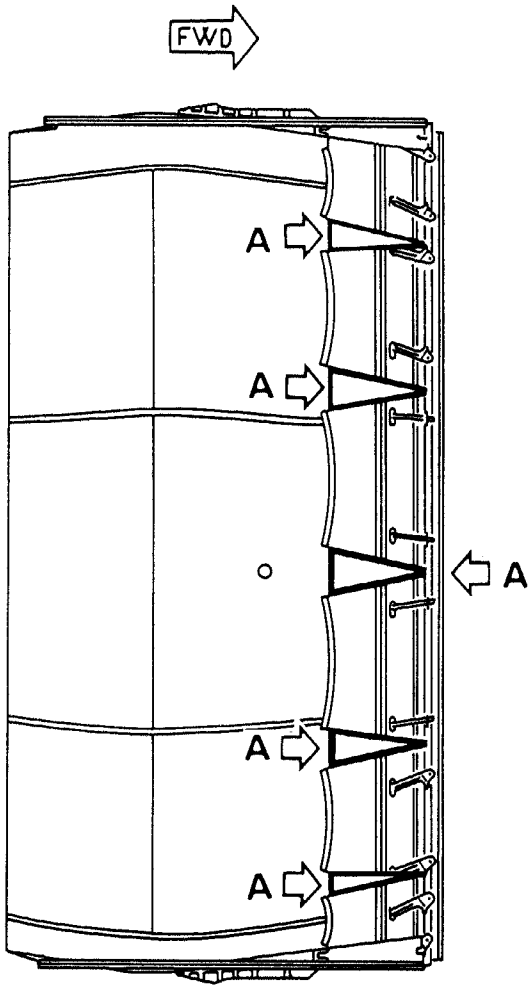
W. Not applicable.

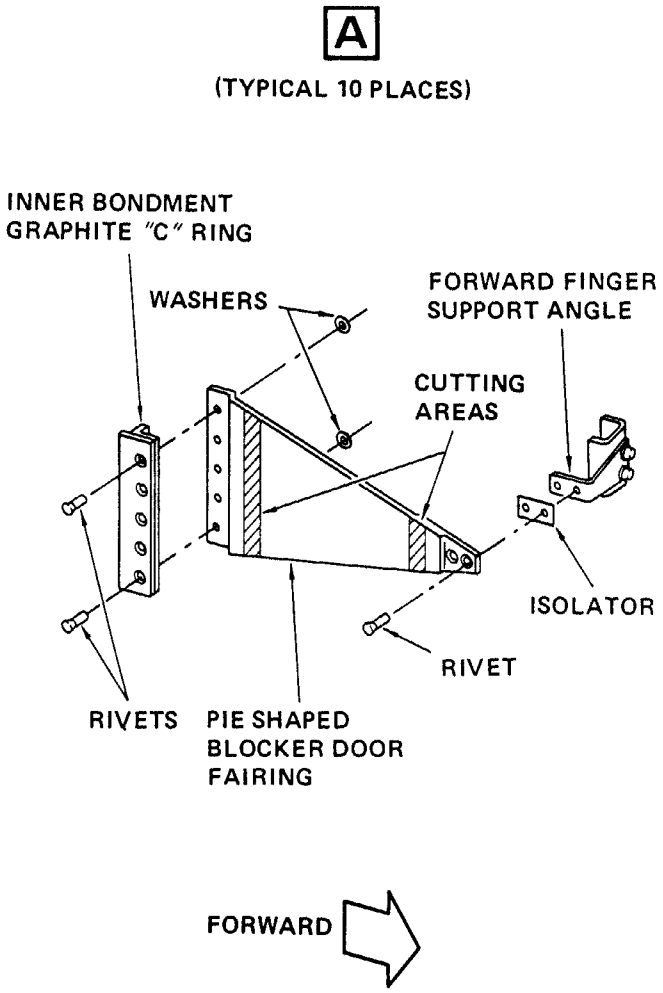
X. Not applicable.

Y. Precooler Duct Removal/Replacement
(Ref. Fig. 829)

(1)If necessary, deploy the translating cowl until you can get access to the precooler duct cap.

(2)Remove the screws that attach the precooler duct cap to the transition





INNER BONDMENT ASSEMBLY
LEFT–HAND SHOWN
(TYPICAL BOTH SIDES)

BM5 78 32 00 8 LKMO - 27 - 22
DM5

CF8–A6254–00–A

Blocker Door Fairings - Approved Repairs
Figure 827

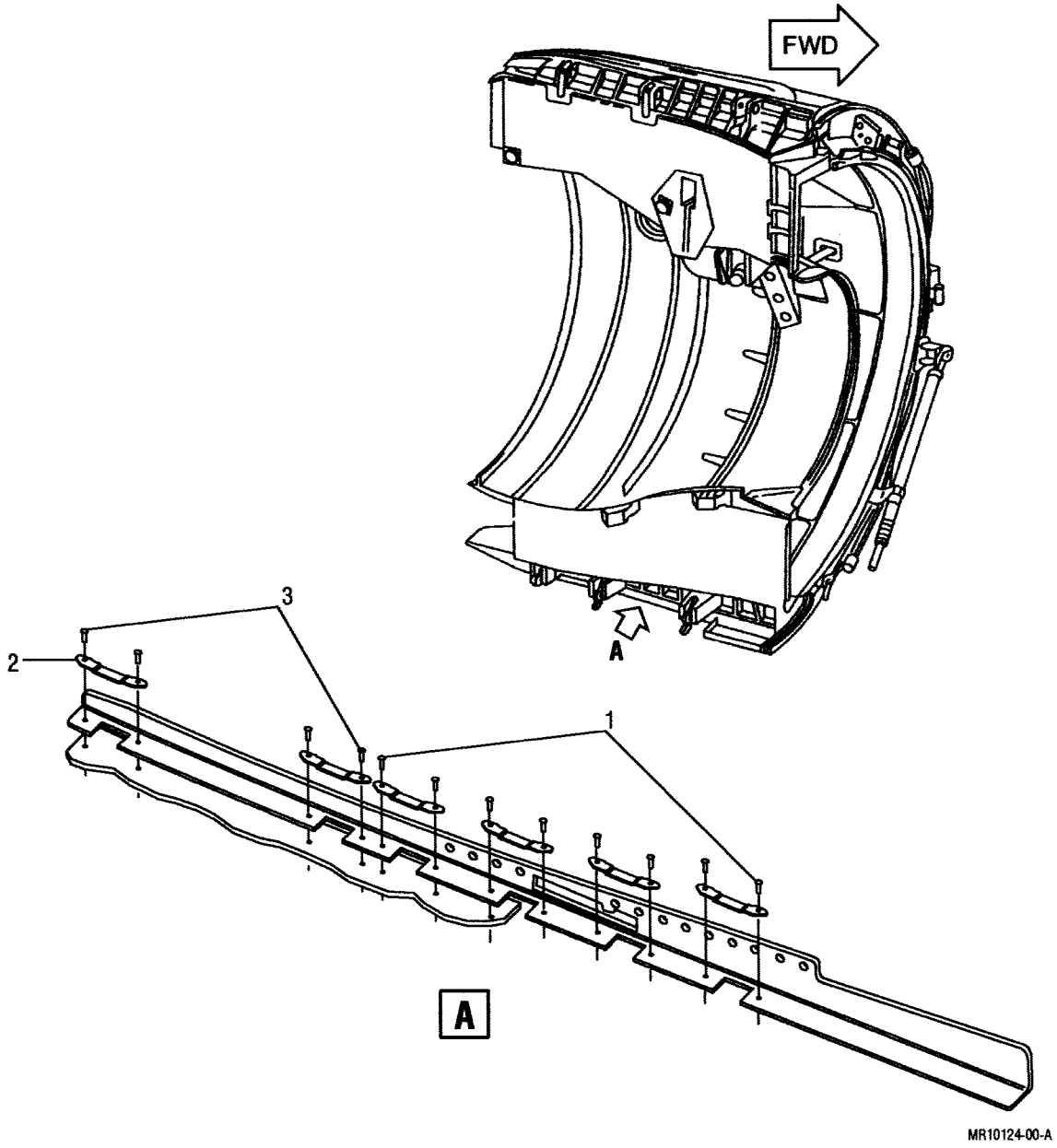
duct assembly.
(3)Stow the translating cowl.
(4)With the reverser open remove the bolts, washers, and nuts that attach the precooler duct to the right hand brace.
(5)Remove the precooler duct and the duct gasket.
(6)Remove the precooler duct bellows from the precooler duct.
(7)Install the precooler duct bellows on the replacement precooler duct.
(8)Attach the precooler duct and duct gasket to the transition duct with the bolts, washers and nuts.
(9)Attach the precooler duct to the right hand brace with the bolts and nuts
(10)TORQUE the bolts to between 24 and 27 lbf. in. (0.27 and 0.31 m.daN).
(11)Close the reverser.
(12)Deploy the translating cowl until you can get access to install the precooler duct cap.
(13)Attach the precooler duct cap to the transition duct with the screws.
(14)Stow the translating cowl.

POST SB 78-1109

Z. Removal/Installation of the Lower Closeout Tee Wearstrip (Ref. Fig. 828)
(1)Tools, equipment and materials. None required.
(2)Do the steps that follow if necessary :
(a)Remove the fire blanket retainer strap and attaching hardware. Keep the retainer strap and attaching hardware for use during installation.
(b)Fold the fire blanket back to get access.
(c)Remove the blanket attaching hardware. Keep the blanket attaching hardware for use during installation.
(3)Drill out the rivets (1) or (3) that attach the damaged wearstrip (2) to the lower closeout tee.
(4)Remove the damaged wearstrip (2).
(5)Do the steps that follow for the forward-most wearstrip only :
(a)Trim the forward edge of the wearstrip (2) as necessary to make the wearstrip (2) fit.
(b)Apply two coats of Epoxy Resin Primer, Material No.C03-005, to the trimmed area. Remove excess primer.
(6)Position the replacement wearstrip (2) on the lower closeout tee and match drill the 0.161 in. (4.1 mm) installation holes from the lower closeout tee.
(7)Deburr the holes in the wearstrip (2) and apply two coats of Epoxy Resin Primer, Material No.C03-005, to all exposed edges on the wearstrip (2). Remove unwanted primer.
(8)Apply Epoxy Resin Primer, Material No.C03-005, to the two rivets (1) or (3).
(9)Wet install the wearstrip (2) using two rivets (1) or (3).

END POST SB 78-1109

AA. Repair of the Torque Box Outer Ring
(1)Equipment and materials.



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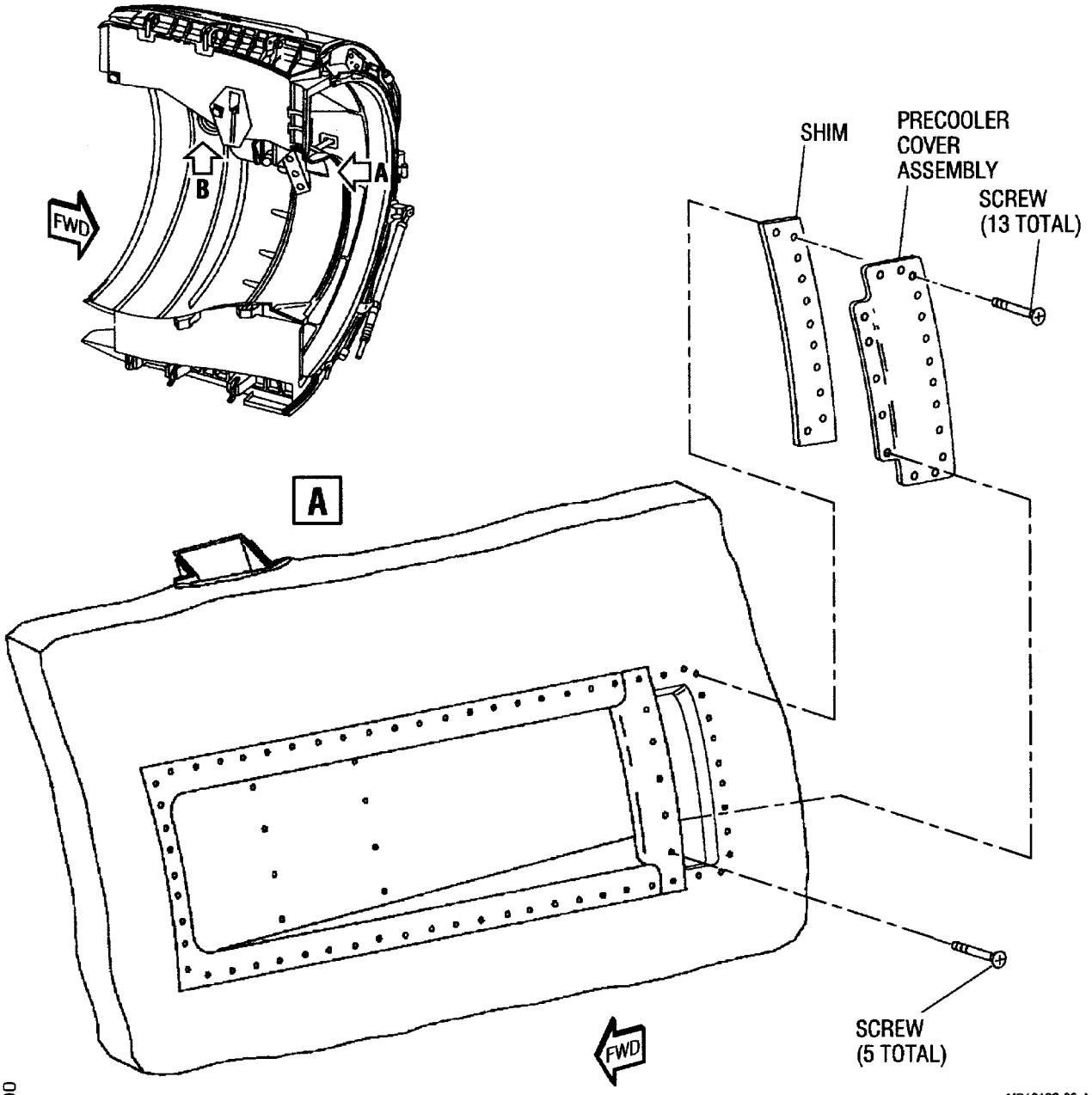
Replacement of the Lower Closeout Tee Wearstrip
(POST SB 78-1109)
Figure 828



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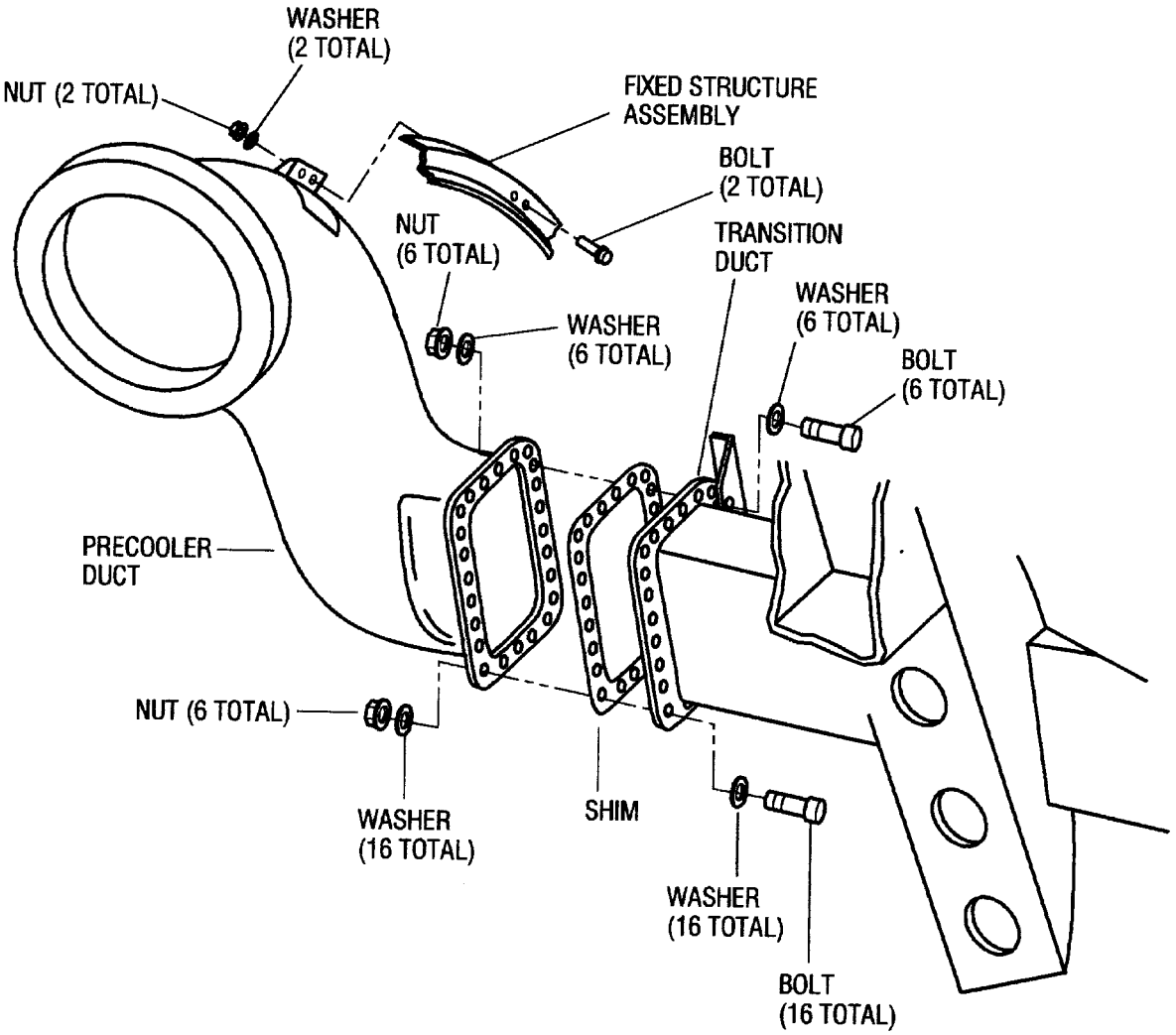
Removal and Replacement of the Precooler Duct
(Sheet 1/2)
Figure 829

B



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Removal and Replacement of the Precooler Duct
(Sheet 2/2)
Figure 829

ITEM	DESIGNATION
(a)	Clamp
(b)	Drill Bit, No. 20
(c)	Countersink, 100 degree
(d) Material No.C01-011	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(e) Material No.C03-005	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(f) Material No.C04-035	Cleaning Compounds and Solvents (Ref. 70-00-00)
(g) Material No.C10-105	Miscellaneous (Ref. 70-00-00)
(h) 3114MP93P001	Doubler (1 per repair)
(i) MS1097AD5	Rivets (2 per repair)
Referenced Procedure	
- 78-31-00, P. Block 501	Fan Reverser Assembly

(2)Procedure (Ref. Fig. 830)

(a)Remove all sharp edges from the wear area.

(b)Prepare the doubler and torque box outer ring as follows :

1 Align the doubler :
- Put the doubler on the torque box outer ring aft edge.
- Make sure that the doubler is fully over the repair area.
- Align the doubler to make sure that the translating cowl bumper will go between and not interfere with the rivets that install the doubler.
- Use a clamp to hold the doubler in position.

2 Use a No. 20 drill bit to drill two rivet installation holes through the doubler and the torque box outer ring aft edge.

3 Remove the doubler.

4 Countersink the holes on the outboard side of the torque box outer ring that were made in step (b). Make the countersink 0.020 in. (0.508 mm) more than what is usually necessary for the rivets.

NOTE : When the repair doubler is installed, the deeper countersink depth will let the rivets pull the repair doubler down into the countersink. This will let the rivets install flush.

5 Deburr the holes in the doubler and the torque box outer ring.

6 Lightly rub the inside surface of the repair doubler with 120 grit sandpaper (Material No.C10-105).

7 Lightly rub all the surfaces of the torque box outer ring that will be in contact with the doubler with 120 grit sandpaper (Material No.C10-105).

WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH SKIN OR CLOTHING.

8 Clean all of the surfaces prepared in steps 6 and 7 with solvent (Material No.C04-035). Let the area dry.

(c)Install the doubler as follows :

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING ADHESIVE. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

1 Follow the manufacturer's instructions to mix the paste adhesive (Material No.C01-011 or equivalent).

2 Apply the paste adhesive (Material No.C01-011) to all of the surfaces on the torque box outer ring that will be in contact with the doubler.

3 Fill the wear area with paste adhesive (Material No.C01-011). Make the adhesive smooth.

WARNING : WEAR CLEAN POLYETHYLENE GLOVES WHEN MIXING OR APPLYING EPOXY. AVOID CONTACT OF RESIN OR CATALYST WITH EYES OR SKIN AND USE ONLY WITH ADEQUATE VENTILATION.

4 Follow the manufacturer's instructions to mix the epoxy resin primer (Material No.C03-005).

5 Apply a layer of primer (Material No.C03-005) to the rivets and all bare metal surfaces of the torque box outer ring.

6 Wet install the doubler with the two rivets. Make sure that the rivets pull the doubler down into the countersking and install flush.

WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH SKIN OR CLOTHING.

7 Use a clean cloth that is moist with isopropyl alcohol (Material No.C04-035) to remove excess primer.

8 Cure the paste adhesive (Material No.C01-011) for 5 to 7 days at 77 degrees F (25 degrees C), or cure for one hour at 200 degrees F (93 degrees C).

(d)Check the gap between the repaired torque box outer ring and the translating cowl bumper (Ref. 78-31-00, P. Block 501).

AB. Close-Up

(1)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Remove access platform.

(4)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

(5)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.

R AC. Repair of Lightning Strike Damage on the Translating Cowl Trailing Edge

R (1)Equipment and Materials

ITEM	DESIGNATION
(a)	Access platform 2.5 m (8ft. 2 in.)
(b)	Drill
(c)	Knife, utility
(d)	Steel, stainless, AMS 5528 17-7 ph cond th 1050, 0.025 in. (0.635 mm) or 0.032 in.

ITEM		DESIGNATION
		(0.813 mm) thick, or equivalent material
(e)		Wipes, cloth, lint-free, BMS 15-5
(f)	CSR927-5-XX	Rivets, (grip length as needed for repair thickness), Qty as required
(g)	Material No.C01-126	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(h)	Material No.C01-155	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(i)	Material No.C03-005	Finishes and Protective Coatings (Ref. 70-00-00)
(j)	Material No.C04-035	Cleaning Compounds and Solvents (Ref. 70-00-00)
(k)	Material No.C10-113	Miscellaneous (Ref. 70-00-00)
(l)	Material No.C10-141	Miscellaneous (Ref. 70-00-00)

(2)Procedure (Ref. Fig. 831, 832)

(a)Remove all damaged material in the repair area. This includes the inner, outer and trailing edge bondment plies and the honeycomb core if necessary.

(b)Do a visual inspection and tap check of the bondment and core in the repair area to verify that all of the damage has been removed.

(c)Remove more honeycomb core and inner, outer and trailing edge plies as needed to make the repair area circular or rectangular.

(d)Inspect the repair area to find what type of repair is needed.

1 If only the inner, outer or trailing edge plies are damaged, do the repair in step (e).

2 If the inner, outer or trailing edge plies are damaged and the honeycomb core damage is 4 sq. in. (25.8 sq. cm) or less, do the repair in step (f).

3 If the inner, outer or trailing edge plies are damaged and the honeycomb core damage is more than 4 sq. in. (25.8 sq. cm), do the repair in step (g).

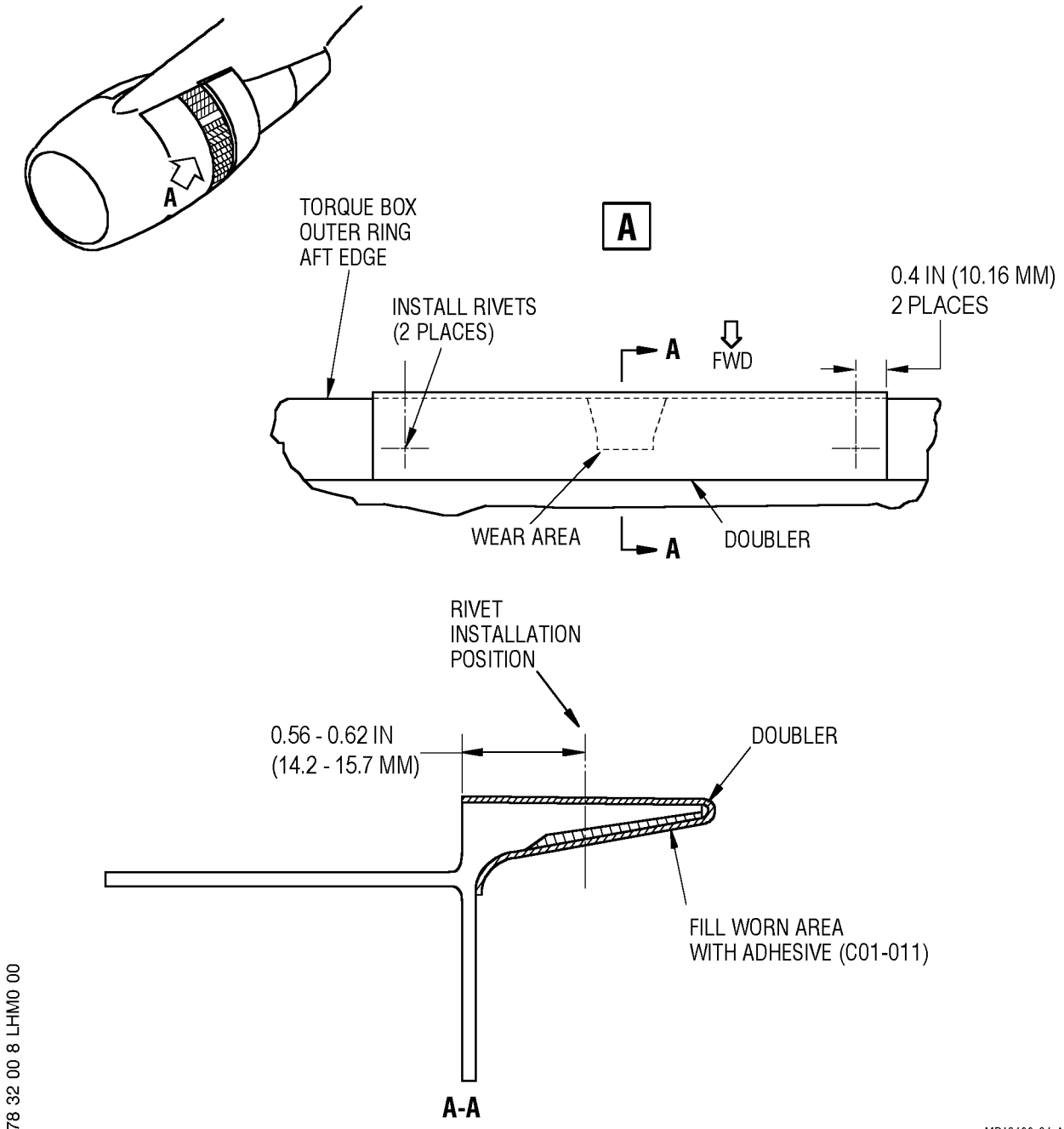
(e)Repair damage to the inner, outer and trailing edge plies as follows :

1 Use 180 grit abrasive paper (Material No. C10-141) to make the edges of the repair area smooth.

2 Use 180 grit abrasive paper (Material No. C10-141) to remove all paint on the bondment within 5 in. (127.0 mm) of the repair area.

WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES, AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIRFLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC, AND HIGHLY FLAMMABLE.

3 Clean the repair area with a clean cloth that is moist with isopropyl alcohol solvent (Material No. C04-035).



BM5 78 32 00 8 LHM0 00

Torque Box Outer Ring Repair
Figure 830

R 4 Make two repair doublers as follows :
R - Use stainless steel stock (AMS 5528 17-7 PH or equivalent) to make the repair doublers. Either 0.025 in. (0.635 mm) or 0.032 in. (0.813 mm) thick stock is acceptable.
R - One doubler will be used on the inside surface of the translating cowl. The other will be used on the outside surface of the translating cowl.
R - Make both doublers in the same general shape as the repair area. For size requirements (Ref. Fig. 831).
R - Taper the forward edge of both doublers to a 45 degree angle (Ref. Fig. 832).
R - Passivate the doublers (Ref. SAE AMS 2700).
R 5 Cut two pieces of bondline netting (Material No. C01-126) that are 0.5 in. (12.7 mm) larger than each doubler.
R 6 Make the repair plies as follows :
R - Cut all the repair plies to fit the repair area without overlap.
R - Cut all the repair plies so that the warp of the plies aligns up and down (as opposed to forward and aft) on the translating cowl.
R WARNING : THIS ADHESIVE IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE ADHESIVE IN AN AREA WITH GOOD AIRFLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE ADHESIVE ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.
R 7 Follow the manufacturer's instructions to mix sufficient adhesive paste (Material No. C01-155) to completely soak all the repair plies and to install the two doublers.
R 8 Completely soak each of the repair plies with adhesive paste (Material No. C01-155) and install the plies in the repair area.
R 9 Install the bondline netting (Material No. C01-126) and the two repair doublers on the repair area with adhesive paste (Material No. C01-155).
R 10 Use clamps to apply pressure to the doublers and the repair area while the adhesive paste is cured :
R - Cure the adhesive paste (Material No. C01-155) for 5 to 7 days at an ambient temperature of 77 deg. F (25 deg. C) or
R - Cure the adhesive paste (Material No. C01-155) for a minimum of one hour at 200 - 220 deg. F (93 - 104 deg. C).
R 11 Use a utility knife to carefully trim away any bondline netting (Material No. C01-126) that you can see around the edges of the two doublers.
R 12 At the trailing edge of the repair area, use a No. 19 drill bit to drill installation holes through the two doublers and the bondment. For hole locations (Ref. Fig. 831, 832).
R 13 At the forward end of the repair doublers, use a No. 19 drill bit to drill installation holes through one doubler, the plies and into the honeycomb core. Do not drill through the other plies and the other doubler. Adhesive will be injected into these holes so they should be drilled from the top down to avoid adhesive leakage. For holes locations (Ref. Fig. 831, 832).

R 14 At the holes drilled in step 13, spoil the honeycomb core in a 1 in. (25.4 mm) diameter.
R WARNING : THIS ADHESIVE IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE ADHESIVE IN AN AREA WITH GOOD AIRFLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE ADHESIVE ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.
R 15 Follow the manufacturer's instructions to mix sufficient adhesive paste (Material No. C01-155) to pot the honeycomb core.
R 16 Fill each of the forward installation holes with adhesive paste (Material No. C01-155).
R 17 Cure the adhesive paste (Material No. C01-155) for 5 to 7 days at an ambient temperature of 77 deg. F (25 deg. C) or cure for a minimum of one hour at 200 - 220 deg. F (93 - 104 deg. C).
R 18 At the forward end of the repair doublers, use a No. 19 drill bit to fully drill the installation holes started in step 13. Drill completely through all plies, the potted honeycomb core and the other repair doubler.
R WARNING : THIS PRIMER IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE PRIMER IN AN AREA WITH GOOD AIRFLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE PRIMER ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.
R 19 At each installation hole drilled in steps 12 and 18, wet install the rivets (CSR927-5-xxx) with primer (Material No. C03-005) (Ref. 70-00-00, P. Block 201).
R (f) Repair damage to the inner, outer and trailing edge plies and to honeycomb core with 4 sq. in. (25.8 sq. cm) or less damage.
R 1 Use 180 grit abrasive paper (Material No. C10-141) to make the edges of the repair area smooth.
R 2 Use 180 grit abrasive paper (Material No. C10-141) to remove all paint on the bondment within 5 in. (127.0 mm) of the repair area.
R WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES, AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIRFLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC, AND HIGHLY FLAMMABLE.
R 3 Clean the repair area with a clean cloth that is moist with isopropyl alcohol solvent (Material No. C04-035).
R 4 Make two repair doublers as follows :
R - Use stainless steel stock (AMS 5528 17-7 PH or equivalent) to make the repair doublers. Either 0.025 in. (0.635 mm) or 0.032 in. (0.813 mm) thick stock is acceptable.
R - One doubler will be used on the inside surface of the translating cowl. The other will be used on the outside surface of the translating cowl.
R - Make both doublers in the same general shape as the repair area. For size requirements (Ref. Fig. 831).

- Taper the forward edge of both doublers to a 45 degree angle (Ref. Fig. 832).
- Passivate the doublers (Ref. SAE AMS 2700).

5 Cut two pieces of bondline netting (Material No. C01-126) that are 0.5 in. (12.7 mm) larger than each doubler.

6 Make the repair plies as follows :

- Cut all the repair plies to fit the repair area without overlap.
- Cut all the repair plies so that the warp of the plies aligns up and down (as opposed to forward and aft) on the translating cowl.

WARNING : THIS ADHESIVE IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE ADHESIVE IN AN AREA WITH GOOD AIRFLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE ADHESIVE ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.

7 Follow the manufacturer's instructions to mix sufficient adhesive paste (Material No. C01-155) to completely soak all the repair plies, pot the honeycomb core damage and to install the two doublers.

8 Completely soak each of the under side repair plies with adhesive paste (Material No. C01-155) and install the plies on the under side of the repair area.

9 Before installing the plies on the upper side of the repair area, fill the honeycomb core damage area with adhesive paste (Material No. C01-155).

10 Completely soak each of the upper side repair plies with adhesive paste (Material No. C01-155) and install the plies on the upper side of the repair area.

11 Install the bondline netting (Material No. C01-126) and the two repair doublers on the repair area with adhesive paste (Material No. C01-155) (Ref. Fig. 831, 832).

12 Use clamps to apply pressure to the doublers and the repair area while the adhesive paste is cured :

- Cure the adhesive paste (Material No. C01-155) for 5 to 7 days at an ambient temperature of 77 deg. F (25 deg. C) or
- Cure the adhesive paste (Material No. C01-155) for a minimum of one hour at 200 - 220 deg. F (93 - 104 deg. C).

13 Use a utility knife to carefully trim away any bondline netting (Material No. C01-126) that you can see around the edges of the two doublers.

14 At the trailing edge of the repair area, use a No. 19 drill bit to drill installation holes through the two doublers and the bondment. For hole locations (Ref. Fig. 831, 832).

15 At the forward end of the repair doublers, use a No. 19 drill bit to drill installation holes through one doubler, the plies and into the honeycomb core. Do not drill through the other plies and the other doubler. Adhesive will be injected into these holes so they should be drilled from the top down to avoid adhesive leakage. For holes locations (Ref. Fig. 831, 832).

16 At the holes drilled in step 15, spoil the honeycomb core in a 1 in. (25.4 mm) diameter.

R WARNING : THIS ADHESIVE IS POISONOUS AND GIVES OFF FUMES. MAKE SURE
R YOU USE THE ADHESIVE IN AN AREA WITH GOOD AIRFLOW. MAKE
R SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE ADHESIVE
R ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE
R GLOVES AND CLOTHING TO PROTECT YOURSELF.
R 17 Follow the manufacturer's instructions to mix sufficient adhesive
R paste (Material No. C01-155) to pot the honeycomb core.
R 18 Fill each of the forward installation holes with adhesive paste
R (Material No. C01-155).
R 19 Cure the adhesive paste (Material No. C01-155) for 5 to 7 days
R at an ambient temperature of 77 deg. F (25 deg. C) or cure for a
R minimum of one hour at 200 - 220 deg. F (93 - 104 deg. C).
R 20 At the forward end of the repair doublers, use a No. 19 drill bit
R to fully drill the installation holes started in step 15. Drill
R completely through all plies, the potted honeycomb core and the other
R repair doubler.
R WARNING : THIS PRIMER IS POISONOUS AND GIVES OFF FUMES. MAKE SURE
R YOU USE THE PRIMER IN AN AREA WITH GOOD AIRFLOW. MAKE
R SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE PRIMER
R ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE
R GLOVES AND CLOTHING TO PROTECT YOURSELF.
R 21 At each installation hole drilled in steps 14 and 20, wet install
R the rivets (CSR927-5-xxx) with primer (Material No. C03-005)
R (Ref. 70-00-00, P. Block 201).
R (g)Repair damage to the inner, outer and trailing edge plies and to
R honeycomb core with damage more than 4 sq. in. (25.8 sq. cm).
R 1 Use 180 grit abrasive paper (Material No. C10-141) to make the
R edges of the repair area smooth.
R 2 Use 180 grit abrasive paper (Material No. C10-141) to remove
R all paint on the bondment within 5 in. (127.0 mm) of the repair
R area.
R WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON
R PROTECTIVE CLOTHING, GOGGLES, AND A FACE MASK. USE THE
R FLUID IN AN AREA WITH GOOD AIRFLOW. DO NOT BREATHE THE
R FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR
R EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR
R SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE,
R TOXIC, AND HIGHLY FLAMMABLE.
R 3 Clean the repair area with a clean cloth that is moist with
R isopropyl alcohol solvent (Material No. C04-035).
R 4 Make two repair doublers as follows :
R - Use stainless steel stock (AMS 5528 17-7 PH or equivalent) to
R make the repair doublers. Either 0.025 in. (0.635 mm) or
R 0.032 in. (0.813 mm) thick stock is acceptable.
R - One doubler will be used on the inside surface of the translating
R cowl. The other will be used on the outside surface of the
R translating cowl.
R - Make both doublers in the same general shape as the repair area.
R For size requirements (Ref. Fig. 831).
R - Taper the forward edge of both doublers to a 45 degree angle
R (Ref. Fig. 832).

- Passivate the doublers (Ref. SAE AMS 2700).

5 Cut two pieces of bondline netting (Material No. C01-126) that are 0.5 in. (12.7 mm) larger than each doubler.

6 Make a patch from honeycomb core (Material No. C10-113). Trim the patch to fit tight within the core repair area and to align with the contours of the inner and outer plies.

7 Make the repair plies as follows :
- Cut all the repair plies to fit the repair area without overlap.
- Cut all the repair plies so that the warp of the plies aligns up and down (as opposed to forward and aft) on the translating cowl.

WARNING : **THIS ADHESIVE IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE ADHESIVE IN AN AREA WITH GOOD AIRFLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE ADHESIVE ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.**

8 Follow the manufacturer's instructions to mix sufficient adhesive paste (Material No. C01-155) to completely soak all the repair plies, pot the honeycomb core damage and to install the two doublers.

9 Completely soak each of the under side repair plies with adhesive paste (Material No. C01-155) and install the plies on the under side of the repair area.

NOTE : If necessary, installation and cure of the honeycomb core patch is permitted before installation of the upper, lower and trailing edge plies.

10 Before installing the plies on the upper side of the repair area, install the honeycomb core repair patch with adhesive paste (Material No. C01-155).

11 Completely soak each of the upper side repair plies with adhesive paste (Material No. C01-155) and install the plies on the upper side of the repair area.

12 Install the bondline netting (Material No. C01-126) and the two repair doublers on the repair area with adhesive paste (Material No. C01-155) (Ref. Fig. 831, 832).

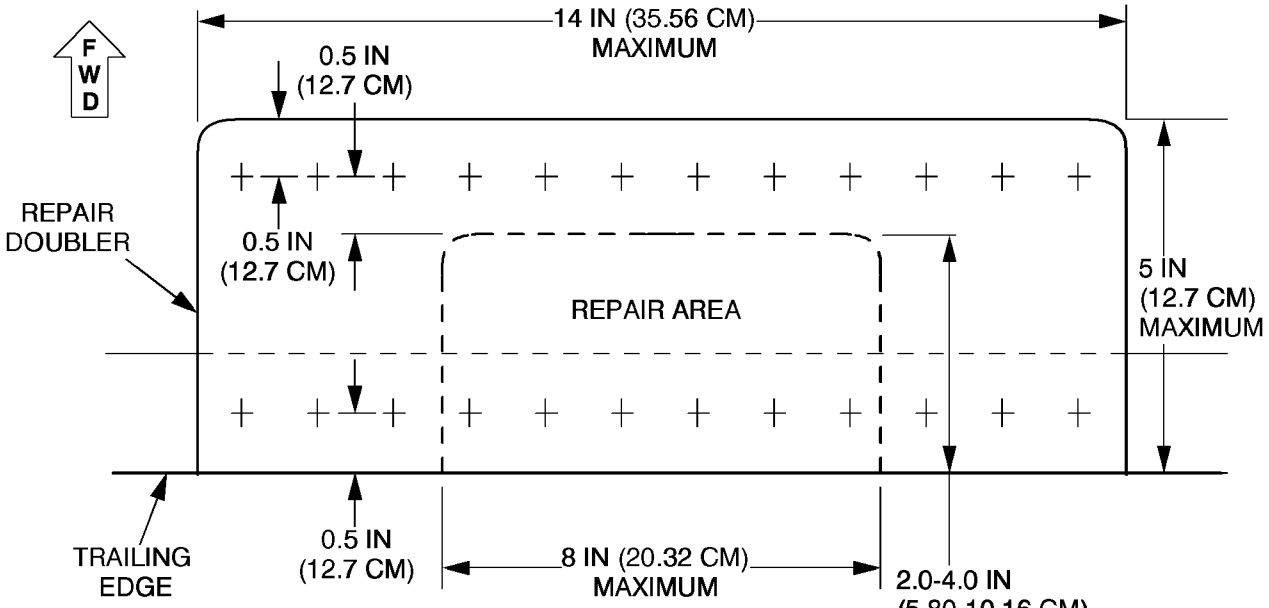
13 Use clamps to apply pressure to the doublers and the repair area while the adhesive paste is cured :
- Cure the adhesive paste (Material No. C01-155) for 5 to 7 days at an ambient temperature of 77 deg. F (25 deg. C) or
- Cure the adhesive paste (Material No. C01-155) for a minimum of one hour at 200 - 220 deg. F (93 - 104 deg. C).

14 Use a utility knife to carefully trim away any bondline netting (Material No. C01-126) that you can see around the edges of the two doublers.

15 At the trailing edge of the repair area, use a No. 19 drill bit to drill installation holes through the two doublers and the bondment. For hole locations (Ref. Fig. 831, 832).

16 At the forward end of the repair doublers, use a No. 19 drill bit to drill installation holes through one doubler, the plies and into the honeycomb core. Do not drill through the other plies and the other doubler. Adhesive will be injected into these holes so

R they should be drilled from the top down to avoid adhesive leakage.
R For hole locations (Ref. Fig. 831, 832).
R 17 At the holes drilled in step 16, spoil the honeycomb core
R in a 1 in. (25.4 mm) diameter.
R **WARNING : THIS ADHESIVE IS POISONOUS AND GIVES OFF FUMES. MAKE SURE**
R **YOU USE THE ADHESIVE IN AN AREA WITH GOOD AIRFLOW. MAKE**
R **SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE ADHESIVE**
R **ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE**
R **GLOVES AND CLOTHING TO PROTECT YOURSELF.**
R 18 Follow the manufacturer's instructions to mix sufficient adhesive
R paste (Material No. C01-155) to pot the honeycomb core.
R 19 Fill each of the forward installation holes with adhesive paste
R (Material No. C01-155).
R 20 Cure the adhesive paste (Material No. C01-155) for 5 to 7 days
R at an ambient temperature of 77 deg. F (25 deg. C) or cure for a
R minimum of one hour at 200 - 220 deg. F (93 - 104 deg. C).
R 21 At the forward end of the repair doublers, use a No. 19 drill bit
R to fully drill the installation holes started in step 16. Drill
R completely through all plies, the potted honeycomb core and the other
R repair doubler.
R **WARNING : THIS PRIMER IS POISONOUS AND GIVES OFF FUMES. MAKE SURE**
R **YOU USE THE PRIMER IN AN AREA WITH GOOD AIRFLOW. MAKE**
R **SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE PRIMER**
R **ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE**
R **GLOVES AND CLOTHING TO PROTECT YOURSELF.**
R 22 At each installation hole drilled in steps 15 and 21, wet install
R the rivets (CSR927-5-xxx) with primer (Material No. C03-005)
R (Ref. 70-00-00, P. Block 201).



NOTES:

1. EDGE DISTANCE FOR ALL FASTENERS IS 0.50 IN (12.7 MM). TYPICAL SPACING FOR ALL FASTENERS IS 1 IN (25.4 MM) MINIMUM TO 1.25 IN (31.75 MM) MAXIMUM. SPACING BETWEEN FASTENERS SHOULD BE THE SAME.
2. USE THE THICKNESS OF THE REPAIR AT EACH FASTENER POSITION TO FIND THE FASTENER LENGTH.
3. THE FORWARD EDGE OF THE DOUBLER SHOULD BE APPROXIMATELY 1 IN (25.4 MM) BEYOND THE REPAIR AREA.
4. THE UP/DOWN EDGES OF THE DOUBLER SHOULD BE APPROXIMATELY 3 IN (7.62 CM) BEYOND THE REPAIR AREA AND CONTAIN THREE FASTENERS EACH.
5. THE FORWARD CORNERS OF THE DOUBLER SHOULD BE ROUNDED WITH A RADIUS OF 0.125 IN (3.175 MM).
6. 2.0 IN (5.80 CM) IS THE MINIMUM AMOUNT OF DAMAGE ALLOWED TO INSTALL THE AFT ROW OF FASTENERS AND 4.0 IN (10.16 CM) IS THE MAXIMUM DAMAGE ALLOWED.

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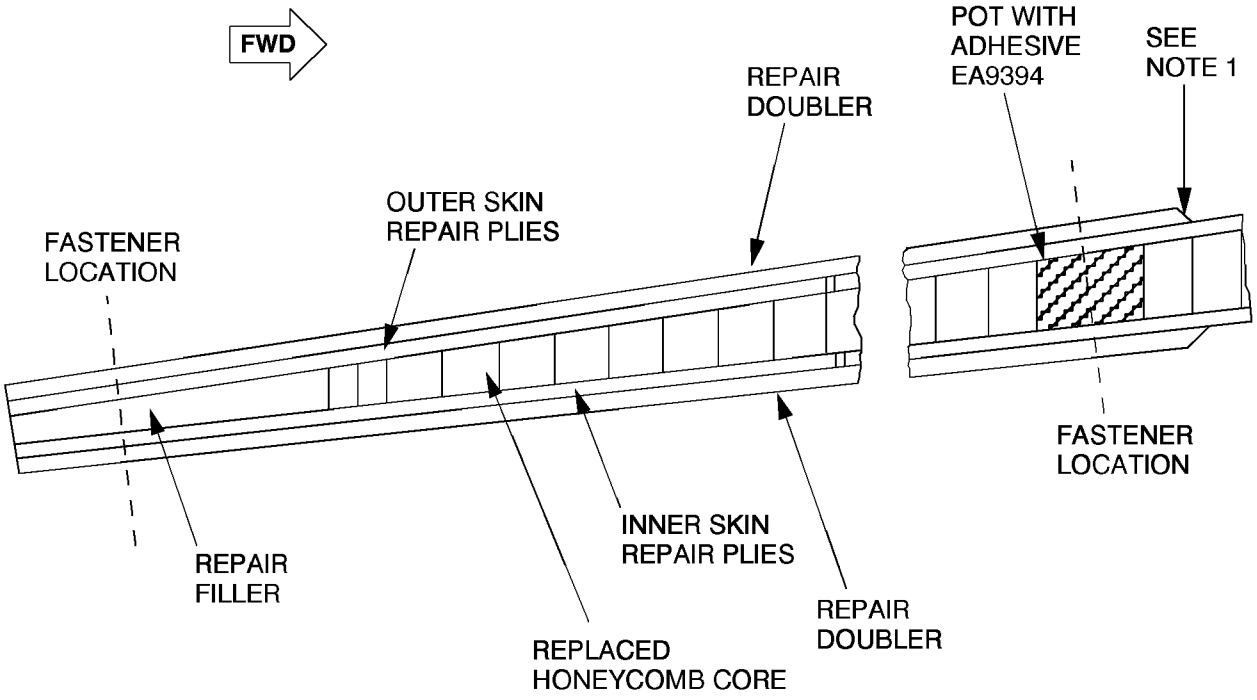
MR10228-01-A

Lightning Damage Repair
Figure 831



NOTES:

1. TAPER THE FORWARD EDGE OF THE DOUBLERS TO 45 DEGREES.
2. THE HONEYCOMB CORE CELLS CAN BE PERPINDICULAR TO THE INNER SKIN PLIES.

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Lightning Damage Repair
Figure 832

R

THRUST REVERSER STRUCTURE - DEACTIVATION/REACTIVATION

1. Deactivation of the Thrust Reverser for Flight with one Blocker Door Missing

A. Reason for the Job
Refer to the CDL TASK : 78-2
Exhaust - Thrust Reverser - Blocker Doors

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notice
(3)	Adjustable Access Platform, 4 ft (1.22 m)
(4)	Access Platform, 8 ft (2.44 m)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 901	Reverser System Control
- 78-32-00, P. Block 801	Fan Reverser Assembly

C. Job Set-up
WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES.
(1)Open, safety and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install the access platform.
(3)Energize the ground service network (Ref. 24-41-00, P. Block 301).
(4)Make the thrust reverser unserviceable (Ref. 78-31-00, P. Block 901).

D. Procedure
(1)Remove the applicable blocker door (Ref. 78-32-00, P. Block 801).
(2)Use one of the procedures that follows to remove the pie-shaped blocker door fairings on each side of the removed blocker door (Ref. Fig. 901).
(a)Rivet removal method
1 Drill out the five rivets that attach the fairing to the inner bondment graphite C-ring. Keep the five washers that are under the rivets.
2 Drill out the two rivets that attach the fairing to the forward finger support angle.
3 Remove the fairing from the translating cowl assembly. Keep the finger support angle isolator.
(b)Cut-out method
1 Cut through the fairing just aft of the rivets that attach the fairing to the forward finger support angle.
2 Cut through the fairing just forward of the rivets that attach the fairing to the inner bondment graphite C-ring. Remove and discard the section of the fairing that you can cut out.
(3)Remove the link arm of the missing blocker door from the core cowl

(Ref. Fig. 902).
(a)Remove the insulation material from the edge of the link arm support bracket.
(b)Remove the nuts, washers, and bolts that attach the link arm support bracket to the core cowl.
(c)Pull the link arm support bracket and the link arm through the bottom of the core cowl to get access to the link arm attach bolt.
(d)Cut and remove the lockwire. Remove the bolt, the washer, and the link pin that attach the link arm to the link support bracket.
(e)Remove the link arm.
(4)Deactivate the thrust reverser system for flight (Ref. 78-31-00, P. Block 901).

E. Close-up
(1)Remove the safety clips and tags and close the applicable circuit breakers.
(2)De-energize the ground service network (Ref. 24-41-00, P. Block 301).
(3)Make sure the work area is clean and clear of tools and other items of equipment.
(4)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

2. Reactivation of the Thrust Reverser with one Blocker Door Missing

A. Reason for the Job
Refer to the CDL TASK : 78-2
Exhaust - Thrust Reverser - Blocker Doors

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notice
(3)	Adjustable Access Platform, 4 ft (1.22 m)
(4)	Access Platform, 8 ft (2.44 m)
(5)	Clean Cloths
(6)	TORQUE Wrench : Range 33 to 37 lbf. in (0.37 to 0.41 m. daN)
(7)Material No.C01-007	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(8)Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
(9)Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
10)Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
11)Material No.C04-003	Cleaning Compounds and Solvents (Ref. 70-00-00)
12)Material No.C04-035	Cleaning Compounds and Solvents (Ref. 70-00-00)
13)Material No.C10-071	Miscellaneous (Ref. 70-00-00)

Referenced Procedures

ITEM	DESIGNATION
- 24-41-00, P. Block 301	AC External Power
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 901	Reverser System Control
- 78-32-00, P. Block 801	Fan Reverser Assembly

C. Job Set-up

WARNING : MAKE SURE THAT THE APPLICABLE CIRCUIT BREAKERS ARE OPEN, SAFETIED, AND TAGGED BEFORE YOU DO THE MAINTENANCE PROCEDURES.

(1)Open, safety and tag the applicable circuit breakers, and open the fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install the access platform.
(3)Energize the ground service network (Ref. 24-41-00, P. Block 301).
(4)Make the thrust reverser unserviceable (Ref. 78-31-00, P. Block 901).

D. Procedure

(1)Install the pie-shaped blocker door fairings at each side of the removed blocker door (Ref. Fig. 901).
(a)If you cut the old fairings to remove them, do steps (a)1 through (a)5.
If you drilled out the rivets to remove the old fairings, do steps (a)3 through (a)5.
1 Drill out the five rivets that attached each of the old fairings to the inner bondment graphite C-ring. Remove and discard the remaining part of the fairing. Keep the five washers that are under the remaining part of the fairing.
2 Drill out the two rivets that attached each of the old fairings to the forward finger support angle. Remove and discard the remaining part of the fairing.
3 Remove unwanted material from the rivet holes for the blocker door fairings.

WARNING : DO NOT GET SOLVENT ON YOUR SKIN OR IN YOUR EYES. PUT ON PROTECTIVE CLOTHING, GOGGLES, AND A FACE MASK. USE THE FLUID IN AN AREA WITH GOOD AIR FLOW. DO NOT BREATHE THE FUMES. IF YOU GET THE SOLVENT ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOUR SKIN OR EYES BECOME IRRITATED. SOLVENTS ARE VOLATILE, TOXIC, AND HIGHLY FLAMMABLE.

4 Use a clean cloth moist with solvent (Material No. C04-001, C04-003, or C04-035) to clean the rivet holes and the adjacent area. Use a clean, dry cloth to dry the area before the solvent dries.
5 Install the new fairings.

WARNING : THIS MATERIAL IS POISONOUS AND GIVES OFF FUMES. MAKE SURE YOU USE THE PRIMER IN AN AREA WITH GOOD AIR FLOW. MAKE SURE YOU DO NOT BREATHE THE FUMES. DO NOT GET THE PRIMER ON YOUR SKIN OR IN YOUR EYES OR MOUTH. MAKE SURE YOU USE GLOVES AND CLOTHING TO PROTECT YOURSELF.

a Put the finger support angle isolator in position on the forward finger support angle, and install the forward end

of the blocker door fairing with two blind rivets. Install the rivets wet with a layer of temperature-resistant sealing compound (Material No.C01-073).

b Put the five washers in position under the aft end of the fairing, and attach the aft end of the blocker door fairing to the inner bondment graphite C-ring with five blind rivets. Install the rivets wet with a layer of temperature-resistant sealing compound (Material No.C01-073).

(2)Attach the blocker door link arm to the core cowl (Ref. Fig. 902).

(a)Attach the link arm support bracket with the bolt, washer, and link pin. TORQUE the bolt to between 33 and 37 lbf.in (0.37 and 0.41 m.daN). Safety with stainless steel lockwire (Material No.C10-071).

(b)Apply adhesive sealant (Material No.C01-115) to the inner surface of the link arm support bracket.

NOTE : The adhesive sealant will prevent an aerodynamic leak.

(c)Put the link arm support bracket in the correct position through the bottom of the core cowl.

(d)Attach the link arm support bracket to the core cowl with the bolts, washers, and nuts. TORQUE the nuts to between 33 and 37 lbf.in (0.37 and 0.41 m.daN).

(e)Apply silicone rubber adhesive (Material No.C01-007) to the edges of the link arm support bracket.

(3)Install a new blocker door to replace the missing blocker door (Ref. 78-32-00, P. Block 801).

(4)Reactivate the thrust reverser system for flight (Ref. 78-31-00, P. Block 901).

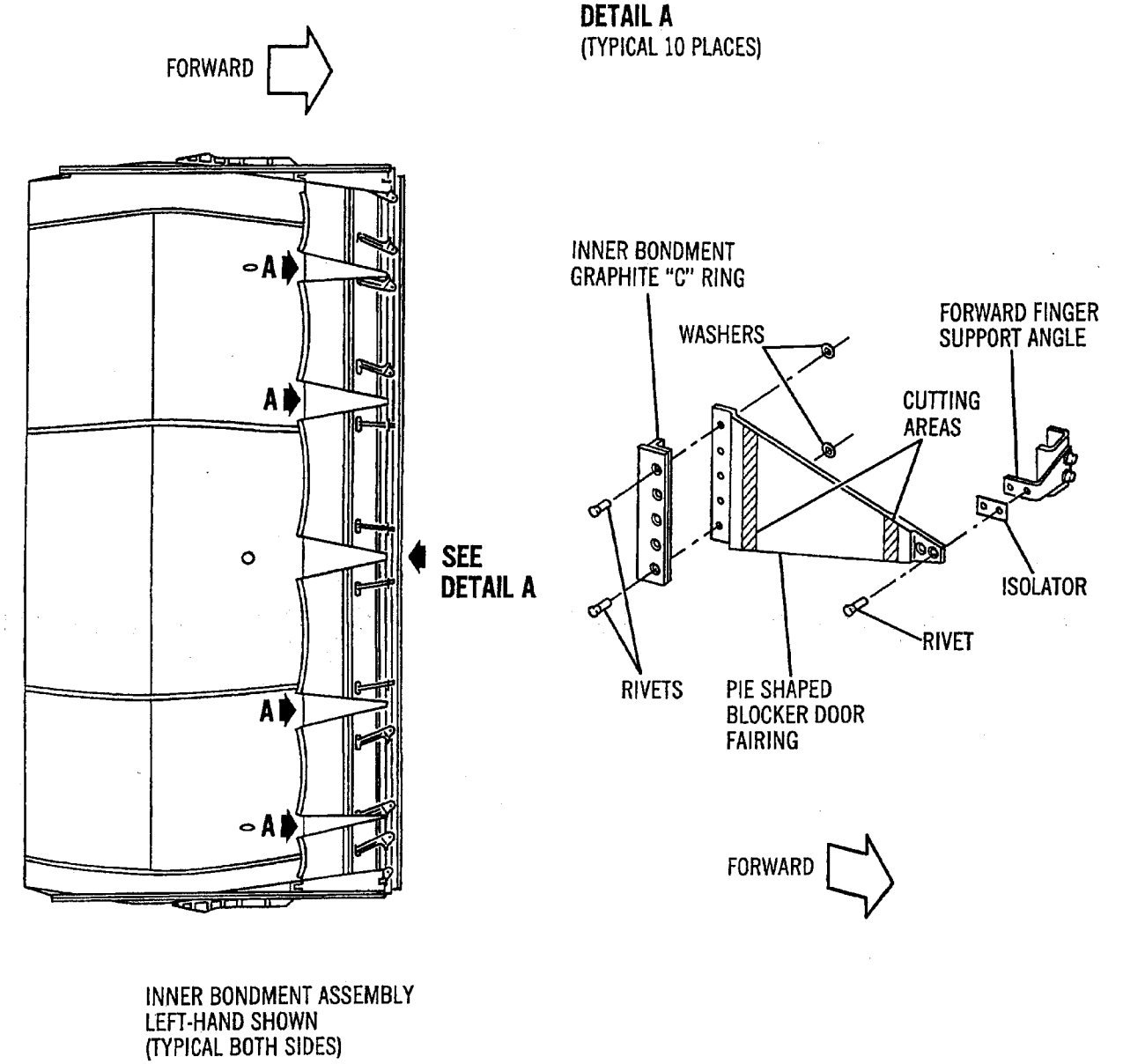
E. Close-up

(1)Remove the safety clips and tags and close the applicable circuit breakers.

(2)De-energize the ground service network (Ref. 24-41-00, P. Block 301).

(3)Make sure the work area is clean and clear of tools and other items of equipment.

(4)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).



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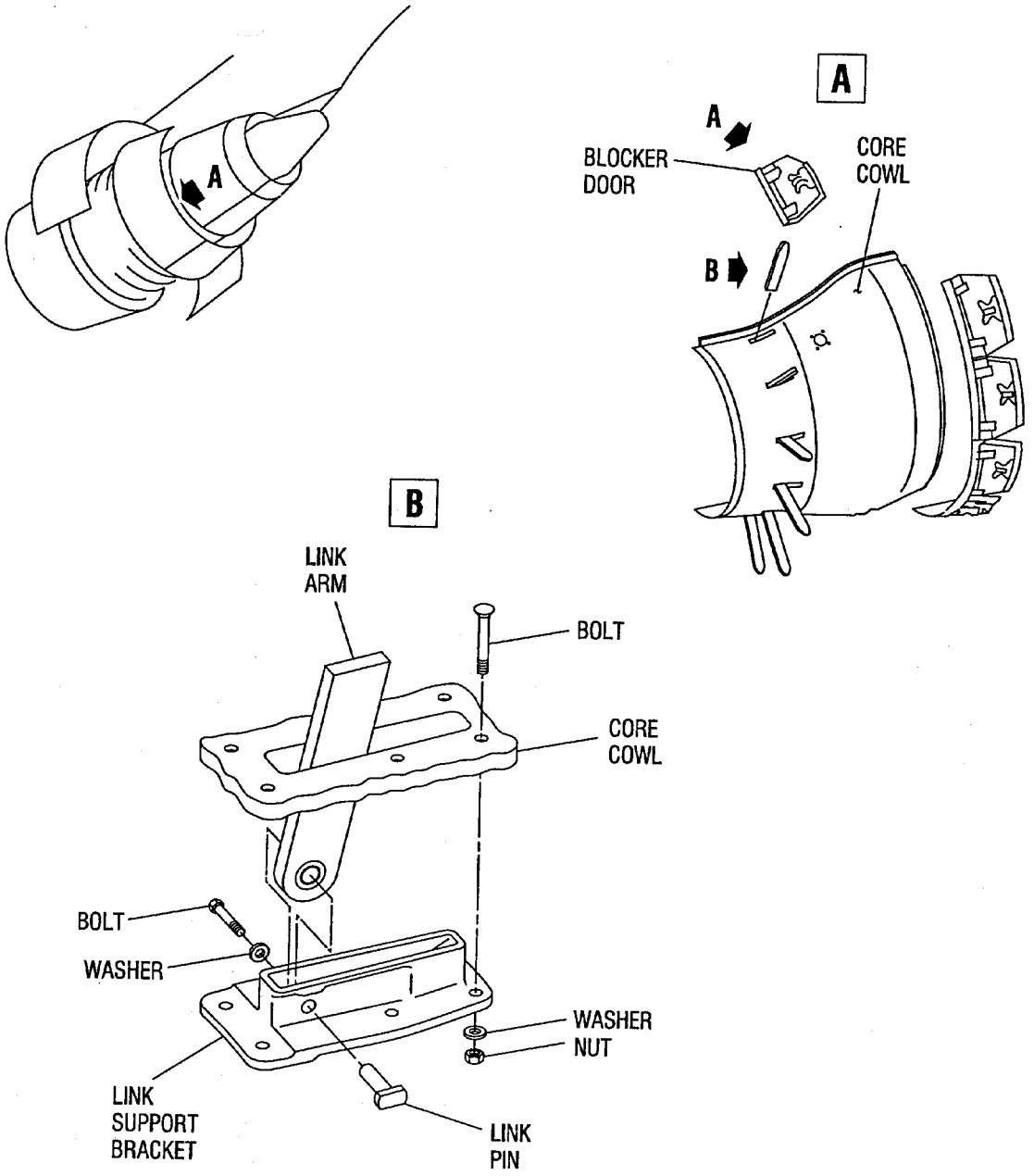
Blocker Door Fairing
Figure 901



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Blocker Door Link Arm
Figure 902

FAN REVERSER TRANSLATING COWL - REMOVAL/INSTALLATION

1. General

The fan reverser assembly includes a left hand translating cowl and a right hand translating cowl. Either translating cowl can be removed/installed independently without requiring the affected reverser half to be removed from the aircraft.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
C. 2C6367	Tool, Install/Remove - Pin, Fan Reverser Actuator
D.	Torque Wrench 24-130 lbf.in. (0.27 - 1.47 m.daN)
E.	Cotter Pin
F. Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
G. Material No.C01-115	Adhesives, Plastics, Sealants (Ref. 70-00-00)
H. Material No.C02-027	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
I. Material No.C02-057	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
R J. Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-00, P. Block 501	Thrust Reverser System Control

3. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

(2) Install access platform.

B. Removal

(1) Manually release the center drive unit (CDU) brake (Ref. 78-31-00, P. Block 501).

(2) Remove the two bolts securing the lockout plate to the CDU and remove the plate.

(3) Insert a 0.25 in. (6.4 mm) square drive speed handle into the auxiliary drive pad and manually drive the translating cowl toward deploy approximately 16 inches (406.4 mm).

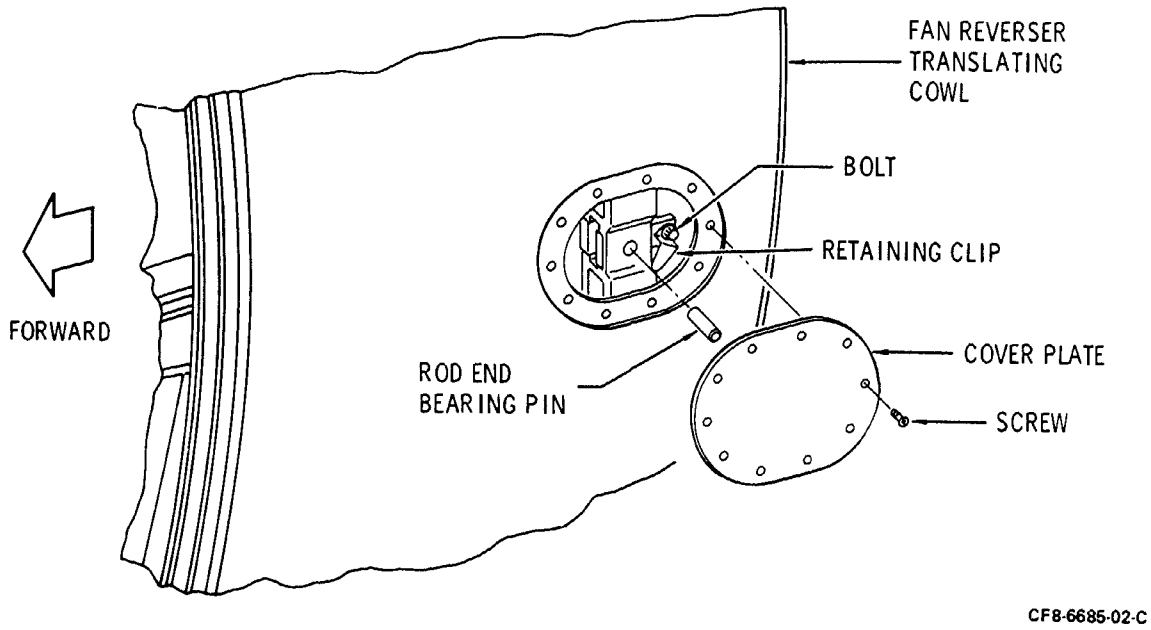
WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(4)Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(5)From the aft side of the blocker doors, disconnect the link assemblies from the blocker doors by removing the 2 bolts securing the spring loaded cover plate to the blocker door.
(6)Remove the link arm attach bolt by pushing the blocker door forward over the link arm. Remove the cotter pin, nuts, washer, and bolt.
NOTE : After the link assemblies are disconnected from the blocker doors, tape the links to the inner support structure to avoid interference with the translating cowl during removal or installation.
(7)On the upper ballscrew actuator, the center drive unit (CDU), and the lower ballscrew actuator : remove the screws that attach each translating cowl clevis pin cover. Remove the covers (Ref. Fig. 401).
(8)If a translating cowl clevis pin cannot be removed from the outer side of the translating cowl, use the following procedure to remove the clevis pin from the inner side of the translating cowl (Ref. Fig. 402). Otherwise, go to paragraph (9).
(a)Get access to the inner side of the translating cowl.
(b)Remove the sealant and get access to the rod end bearing pin access cap at the ballscrew actuator.
(c)Remove the rod end bearing pin access cap.
(d)Remove the inner retainer.
(e)Use the pin install/remove tool 2C6367G01 to remove the clevis pin that attaches the ballscrew actuator to the translating cowl.

CAUTION : DO NOT REMOVE CLEVIS PIN RETAINING CLIP BOLT. BACK BOLT OUT ONLY ENOUGH TO ROTATE RETAINING CLIP. REMOVAL OF BOLT WILL DAMAGE NUTPLATE.

(9)Loosen bolts securing retaining clips and rotate clips 90°.
(10)Remove internally threaded clevis pins by inserting the pin install/remove tool 2C6367G01 and tapping pins out.
(11)Slide the translating cowl aft taking care to fully support it as the T-hinges of the translating cowl move off of the T-guides of the outer support assembly.
NOTE : Ensure that the ballscrew actuators remain in the same position so that the cowl gap will not be disturbed.
(12)Place the removed translating cowl on a clean surface with the leading edge of the cowl down.

C. Installation
(1)Lift the translating cowl and position to engage the T-hinges of the cowl into the T-guides of the outer support assembly.
CAUTION : DO NOT ROTATE BALL SCREWS RELATIVE TO THEIR PREVIOUS POSITION, HOWEVER, SLIGHT MOVEMENT MAY BE REQUIRED TO ALIGN THE ROD END WITH THE TRANSLATING COWL CLEVISES.
(2)Slowly slide the translating cowl forward while supporting the upper ballscrew actuator, the center drive unit (CDU), and the lower ballscrew actuator, to align their rod ends with their related translating cowl clevises.
(3)Use the pin install/remove tool 2C6367 and install the three clevis pins



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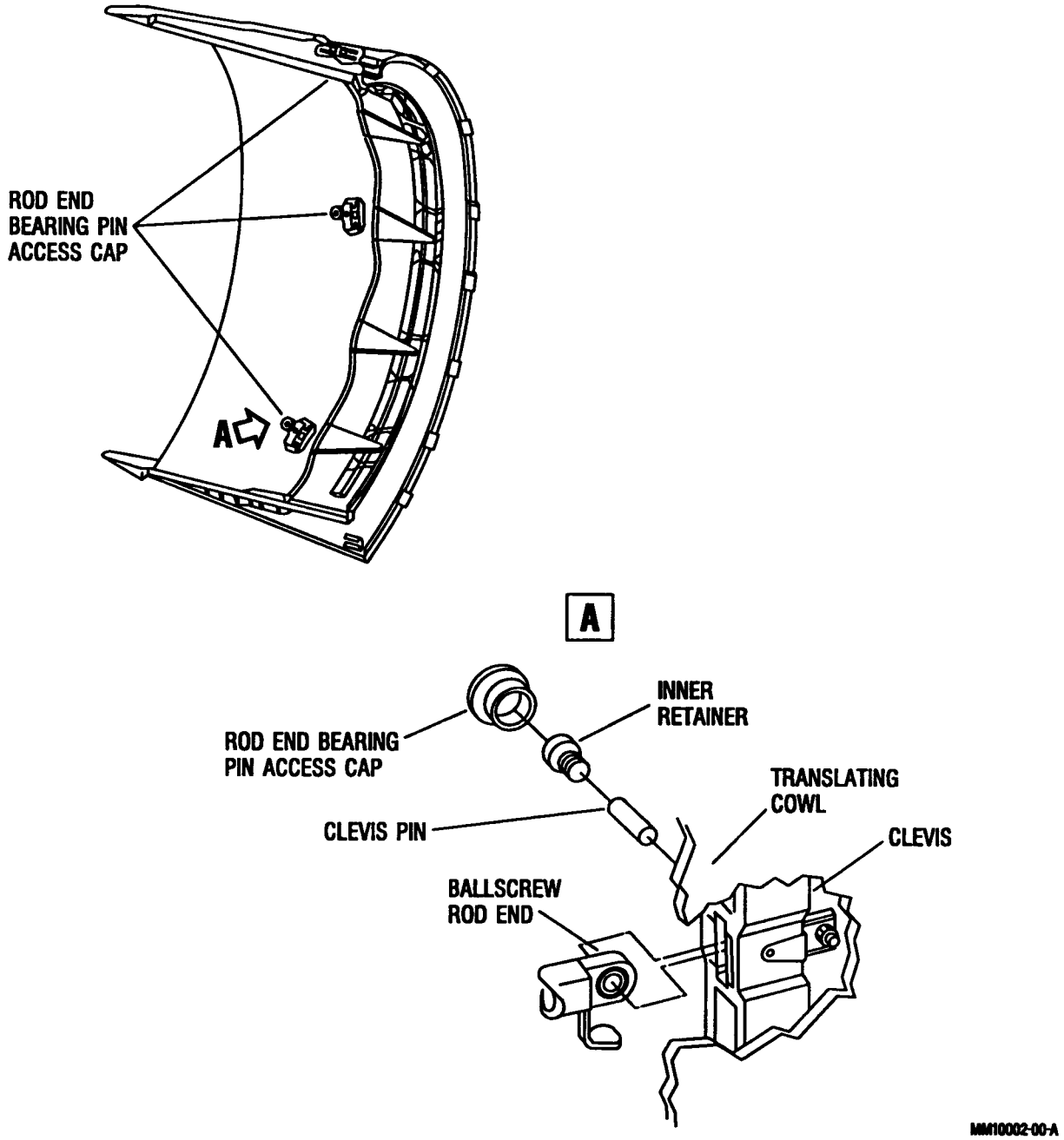
Rod End Bearing Pin Removal
Figure 401



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Clevis Pin - Alternative Removal Method
Figure 402

to attach the rod ends of the upper ballscrew actuator, the CDU, and the lower ballscrew actuators to the translating cowl.

NOTE : If a clevis pin was removed from the inner side of the translating cowl, do steps 3.C.(6) through 3.C.(6)(h).

(4)Position retaining clip over clevis pin and TORQUE bolt to between 55 and
R 70 lbf.in. (0.62 and 0.79 m.daN). Install lockwire (Material No. C10-071)
R through the head of the bolt and around the retaining clip.

CAUTION : DO NOT TORQUE THE COVER PLATE SCREWS MORE THAN THE SPECIFIED TORQUE VALUE. TOO MUCH TORQUE ON THE SCREWS CAN CAUSE CRACKS IN THE ACCESS PANEL.

(5)Install the cover plate and TORQUE screws to between 22 and 27 lbf.in. (0.24 and 0.30 m.daN).

(6)If a clevis pin was removed from the inner surface of the translating cowl, install the clevis pin as follows (Ref. Fig. 402). Otherwise, go to paragraph (7).

(a)Align the ballscrew rod end bolt hole with the translating cowl clevis bolt hole.

(b)Get access to the inner surface of the translating cowl. Install the clevis pin through the ballscrew rod end bolt hole and the clevis bolt hole.

WARNING : MATERIAL NO.C02-057 IS AN AGENT THAT IS AN IRRITANT, MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-057 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-057 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(c)Lubricate the threads of the inner retainer with Material No.C02-057.

(d)Install the inner retainer.

WARNING : MATERIAL NO.C02-027 IS AN AGENT THAT IS POISONOUS, CARCINOGENIC, AN ASPHYXIANT, AND AN IRRITANT, MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C02-027 IS USED.
- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAME.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MATERIAL NO.C02-027 IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE

PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(e)Lubricate the threads of the rod end bearing pin access cap with Material No.C02-027.

(f)Install the rod end bearing pin access cap.

(g)TORQUE the rod end bearing pin access cap to between 76 and 100 lbf.in. (0.86 and 1.13 m.daN).

WARNING : MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN MATERIAL NO.C01-073 OR MATERIAL NO.C01-115 IS USED.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.

WARNING : REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR :
- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.
TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(h)Apply Material No.C01-073 or Material No.C01-115 fully on the rod end bearing pin access cap.

(7)Remove tape and connect the blocker door link assemblies to the blocker door clevises and secure using the bolts, washers, and nuts removed in paragraph B.(7). TORQUE to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN) and wirelock using a new cotter pin.

(8)Install the cover plate with 4 springs over the link assembly and install the 2 securing bolts. TORQUE bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

(9)Remove two bolts securing the lockout plate (on CDU) and remove plate.

(10)Using a 0.25 inch (6.4 mm) square drive speed handle inserted into the auxiliary drive pad of the CDU, manually drive the translating cowl to the near stow stop position.

D. Test and Close-Up

(1)Check rigging of fan reverser half (Ref. 78-31-00, P. Block 501).

(2)Install the lockout plate with the square drive exposed onto the CDU'S auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipments.

(4)Remove access platform and close fan cowl doors (Ref. 71-13-00, P. Block 301).

(5)Remove safety clips and tags and close the appropriate circuit breakers (Ref. 71-13-00, P. Block 301).

FAN REVERSER TRANSLATING COWL BLOCKER DOOR HINGE - REMOVAL/INSTALLATION

1. General

This procedure provides instructions for the removal and installation of the fan reverser translating cowl blocker door hinge assembly.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
C.	Torque Wrench
D. Material No.C01-011	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-32-00, P. Block 801	Fan Reverser Assembly

3. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(2) Install access platform.

WARNING : FAILURE TO DEACTIVATE THRUST REVERSER HALF FOR GROUND MAINTENANCE COULD RESULT IN INADVERTENT OPERATION WITH POSSIBLE INJURY TO PERSONNEL AND/OR DAMAGE TO AIRPLANE/EQUIPMENT.

(3) Remove bolts securing stored inverted lockout plate on the left and right CDU's auxiliary drive pads.
Install the lockout plate square drive into the auxiliary drive pad and secure with removed bolts.
TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Removal - Configurations 1 and 2 (Ref. Fig. 401, 402)

(1) Remove blocker doors (Ref. 78-32-00, P. Block 801).

CAUTION : RETAIN SHIMS ISOLATORS IN THE SAME POSITION AS WHEN REMOVED. IF SHIMS ARE INADVERTENTLY DISCARDED ADD NEW SHIMS TO THE FRONT LEG FIRST TO ALIGN AFT LEG BOLTHOLES WITH THOSE IN TRANSCOWL. SHIM AFT LEG, IF NECESSARY, TO THE POINT WHERE THE BLOCKER DOOR RESTS EVENLY IN THE TRANSCOWL POCKET.

(2) Remove the nuts, washers, shims and bolts (if applicable) from the front leg of the hinge assembly.

(3) For configuration 2 only, remove the nuts, washers and bolts from the C-channel flange connection of the hinge assembly.

(4) Remove the nuts, washers, isolator, shims and bolts (if applicable) from the aft leg of the hinge assembly.

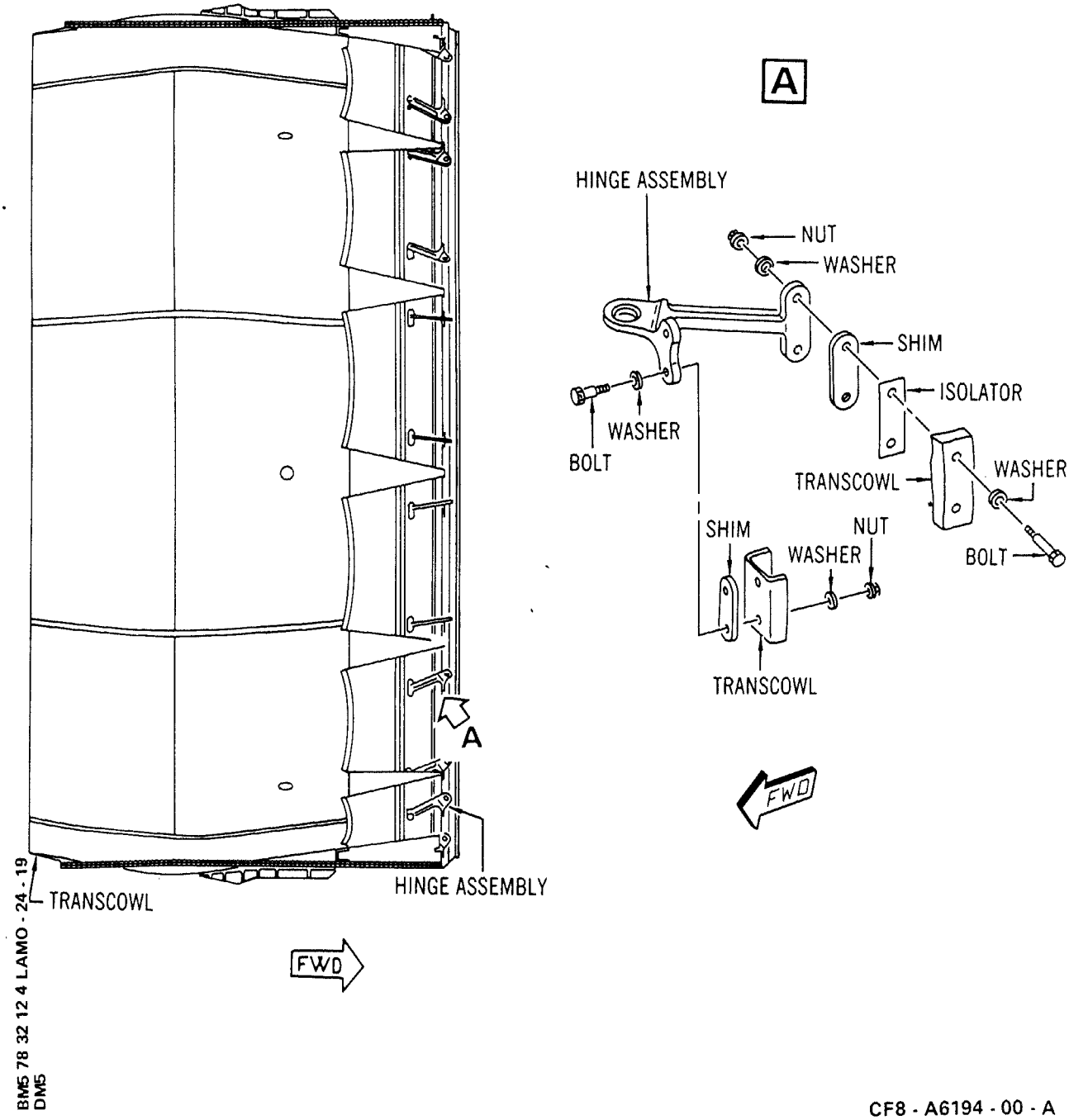
(5) Remove the hinge assembly.

C. Installation - Configuration 1 (Ref. Fig. 401)

(1)Align hinge assembly in transcowl and install bolts, shims, washers, and nuts in the forward leg of the hinge assembly. TORQUE nuts to between 33 and 37 lb in. (0.37 and 0.42 m.daN).
(2)Align aft leg of hinge assembly to rest in pocket of transcowl and install bolts, isolators, shims, washers and nuts. TORQUE nuts to between 33 and 37 lb in. (0.37 and 0.42 m.daN).
(3)Install blocker doors (Ref. 78-32-00, P. Block 801).

D. Installation - Configuration 2 (Ref. Fig. 402)
(1)Align the hinge assembly in the transcowl. Install the bolts, washers and nuts through the bondment, with the bolt heads and washers on the hinge side. TORQUE the nuts to between 15 and 20 lbf.in. (0.17 and 0.23 m.daN). Install cotter pins. Put Material No.C01-011 on each pin.
(2)Install the bolts, washers and nuts through the hinge and C-channel flange. Use one washer under the bolt head on the hinge-side and up to two washers with each nut on the C-channel flange-side. TORQUE the nuts to between 18 and 26 lbf.in. (0.20 and 0.29 m.daN).
(3)Install the bolts, washers and nuts through the hinge and forward face of the C-channel. Install one washer under the bolt head on the hinge-side and up to two washers with each nut on C-channel-side. TORQUE the nuts to between 30 and 40 lbf.in. (0.34 and 0.45 m.daN).
(4)Install blocker doors (Ref. 78-32-00, P. Block 801).

E. Close-Up
(1)Remove bolts securing the lockout plate on the left and right CDU's auxiliary drive pads. Install the lockout plate with the square drive exposed onto the CDU's auxiliary drive pad with removed bolts. TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove access platform.
(4)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.



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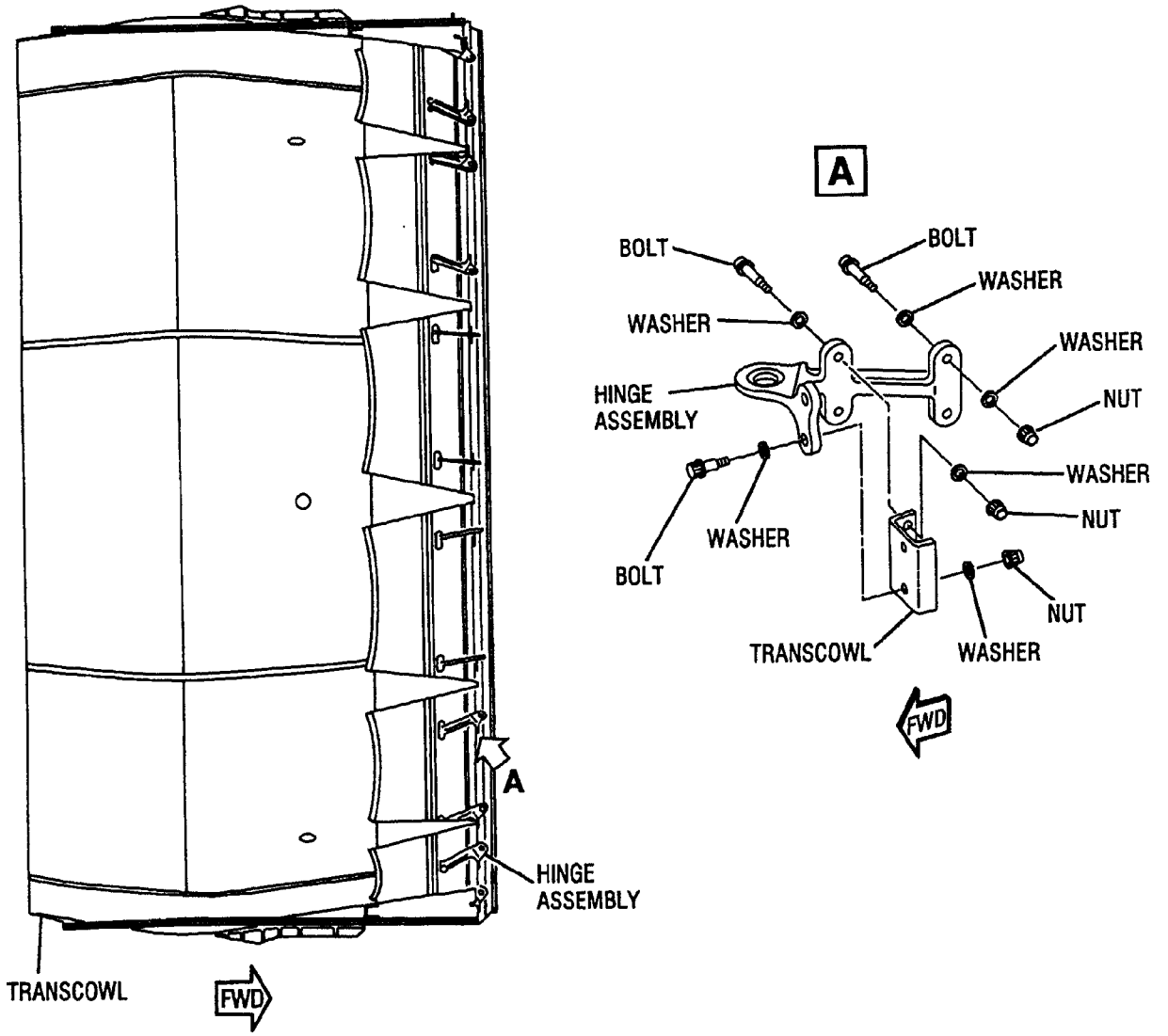
Transcowl Blocker Door Hinge Assembly - Configuration 1
Figure 401



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Transcowl Blocker Door Hinge Assembly - Configuration 2
Figure 402

TRANSLATING COWL INNER BONDMENT SEAL - REMOVAL/INSTALLATION

1. General

A. The translating cowl inner bondment seal is located between the fixed structure and the forward circumference of the translating cowl inner bondment.

NOTE : Post SB GE78-1005 engines have a translating cowl with a double inner bondment seal configuration to provide improved stow retention and longer operating life of the seal. The new configuration includes a row of P-seal segments adjacent to the inner bondment seal.

B. This removal/installation procedure provides the instruction to remove and install the translating cowl inner bondment seal.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Razor Blade or Sharp Knife
C.	Torque Wrench 14-860 lbf.in. (0.16-9.7 m.daN)
D.	No. 8 Fastener Torque Tip Apex Tip
E.	No. 2X Phillips Apex tip
F.	No. 8 Fastener 170-8 Apex Tip
G.	Cobalt or High Carbide 0.19 in. (4.83 mm) Diameter Drill Bit
H.	Right Angle Pneumatic Drill with Magnetic Retention or Equivalent
I.	1/4-inch Drive or Equivalent Small Ratchet with Magnetic or Equivalent Retention
J. Material No.C01-073	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the appropriate circuit breakers and open the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : SEVERE PERSONAL INJURY AND HARDWARE DAMAGE CAN RESULT IF YOU DO NOT DISCONNECT POWER TO THE DIRECTIONAL PILOT VALVE (DPV).

(2)Disconnect the electrical cable from the directional pilot valve (DPV) solenoid.

(3)Deploy the translating cowl.

(a)Release the center drive unit (CDU) brake by pulling the handle out away from the CDU (approximately 60°) until a flat is felt.

(b)Remove the two bolts securing the lockout plate to the CDU and remove the plate.

(c)Install a 0.25 in. (6.35 mm) square drive handle into the CDU auxiliary drive pad. Crank the translating cowl 5-7 in. (12.7-17.8 cm) away from the fully stowed position.
(d)Remove the 0.25 in. (6.35 mm) square drive handle from the CDU auxiliary drive pad.
(e)Install the lockout plate on the CDU with the two bolts. TORQUE the bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

B. Removal (Ref. Fig. 401)
(1)At the interface between the end seal and the end of the inner bondment seal, use a razor blade or a sharp knife to cut the plug which connects the inner bondment seal to the end seal. Do this at both the upper (12 o'clock) and the lower (6 o'clock) position ends of the inner bondment seal.
NOTE : Do not remove the end seals in this procedure.

Pre SB GE78-1005

CAUTION : ON MARTIN MARIETTA TRANSLATING COWLS, THE SCREWS MAY BE SECURED WITH EPOXY. TAKE CARE TO AVOID SLIPPAGE AND DAMAGE TO THE INNER BONDMENT.

(2)On Martin Marietta translating cowls, use a No. 8 fastener 170-8 Apex tip to remove the 48 screws and 48 washers that attach the inner bondment seal to the seal support angle and the seal retainer. Drill out the screws that cannot be removed. Go to step (5).
(3)On Grumman translating cowls, use a No. 8 fastener 170-8 Apex tip to remove the first screw at either end of the inner bondment seal. Drill out the screws that cannot be removed.
(4)On Grumman translating cowls, use a No. 8 fastener torque tip Apex tip to remove the remaining 46 screws that attach the inner bondment seal to the inner bondment and the seal retainer. Drill out the screws that cannot be removed.

End Pre SB GE78-1005

Post SB GE78-1005

(2)Use a No. 8 fastener 170-8 Apex tip to remove the first two screws at either end of the inner bondment seal. Drill out the screws that cannot be removed.
(3)Use a No. 2X Phillips Apex tip to remove the remaining 44 screws that attach the inner bondment seal to the inner bondment or seal support angle and the seal retainer. Drill out the screws that cannot be removed. Go to step (5).

End Post SB GE78-1005

(5)Remove the six seal retainers. If the seal retainers are held in with sealant, pull them out carefully.

Pre SB GE78-1005

(6)Remove the inner bondment seal.
(a)Retain the seal for use when installing the replacement seal.

End Pre SB GE78-1005

Post SB GE78-1005

(6)Remove the six P-seal segments and the inner bondment seal.
(a)Retain the inner bondment seal for use when installing the replacement seal.

End Post SB GE78-1005

(7)Use a razor blade or a sharp knife to remove the plug remaining in each end seal. Make sure you do not damage the end seal.

C. Installation (Ref. Fig. 401)

(1)Lay the previously removed inner bondment seal next to the replacement inner bondment seal. Align the screw holes in the two seals.

(2)Use a razor blade or sharp knife to cut off the ends of the replacement seal so that it is the same length as the old seal.

(3)Discard the old seal.

(4)Position the replacement inner bondment seal at the 6 o'clock position. Lay the other end over the blocker doors near the 12 o'clock position to make installation easier.

Pre SB GE78-1005

(5)At the two top holes in the inner bondment or seal support angle, install two screws and two washers through the holes in the inner bondment or seal support angle, the inner bondment seal, and the seal retainer. Tighten the screws hand-tight.

NOTE : Use the washers only if you have a Martin Marietta translating cowl.

(6)Starting at the third hole from the top in the inner bondment or seal support angle, install 44 screws and 44 washers through the holes in the inner bondment or seal support angle, the inner bondment seal, and the seal retainer. Tighten the screws hand-tight.

NOTE : Use the washers only if you have a Martin Marietta translating cowl.

(7)At the two lowest holes in the inner bondment or seal support angle, install two screws and two washers into the inner bondment or seal support angle, the inner bondment seal, and the seal retainer. Tighten the screws hand-tight. Go to step (11).

NOTE : Use the washers only if you have a Martin Marietta translating cowl.

(8)Not applicable.

(9)Not applicable.

(10)Not applicable.

End Pre SB GE78-1005

Post SB GE78-1005

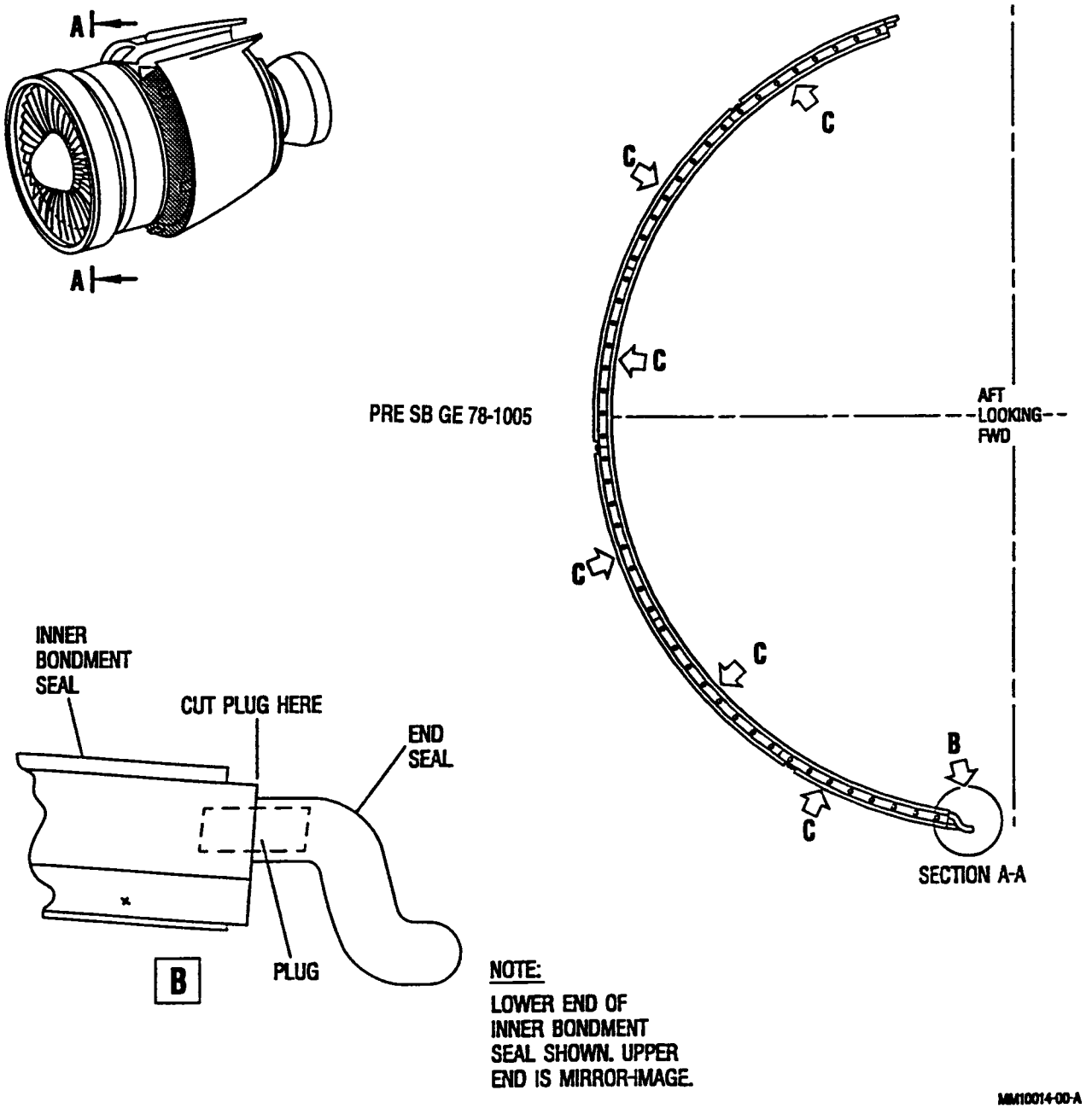
(5)At the two top holes in the inner bondment or seal support angle, install two screws through the holes in the inner bondment or seal support angle, the inner bondment seal, and the seal retainer. Tighten the screws hand-tight.

(6)Starting at the third hole from the top in the inner bondment or seal support angle, install six screws into the short P-seal segment, the inner bondment or seal support angle, the inner bondment seal, and the seal retainer.
Tighten the screws hand-tight.

NOTE : The short P-seal segments do not extend to the two top or the two lowest holes in the inner bondment or seal support angle.

(7)Leave approximately 1 in. (25.4 mm) between the short P-seal segment and the adjacent long P-seal segment.

(8)Install eight screws into each of the next four long P-seal segments, the inner bondment or seal support angle, the inner bondment seal, and



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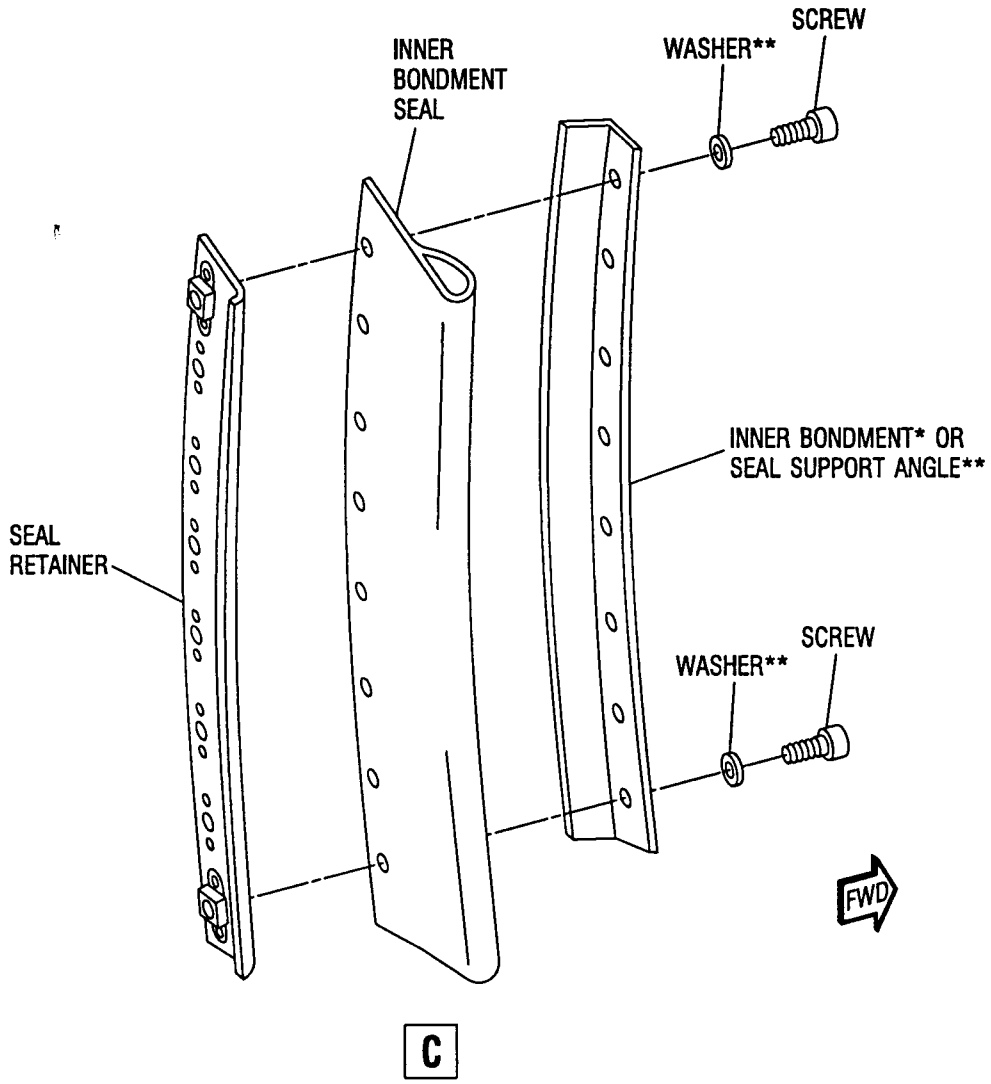
Inner Bondment Seal Installation (Sheet 1/3)
Figure 401



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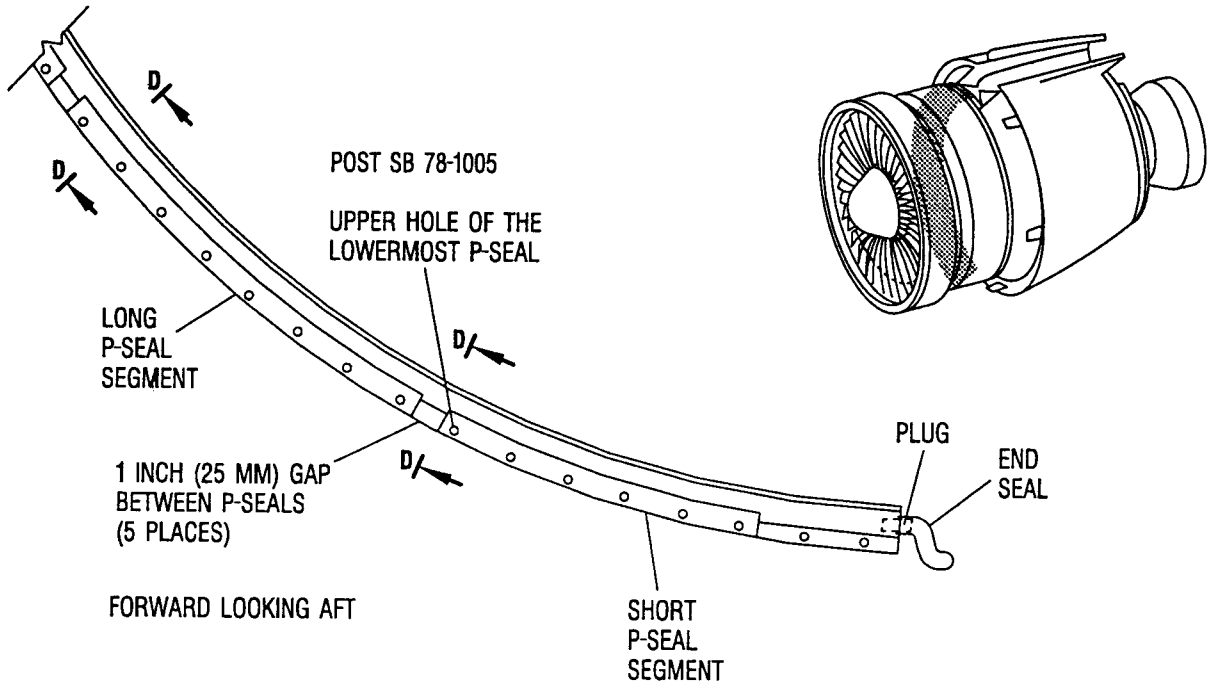
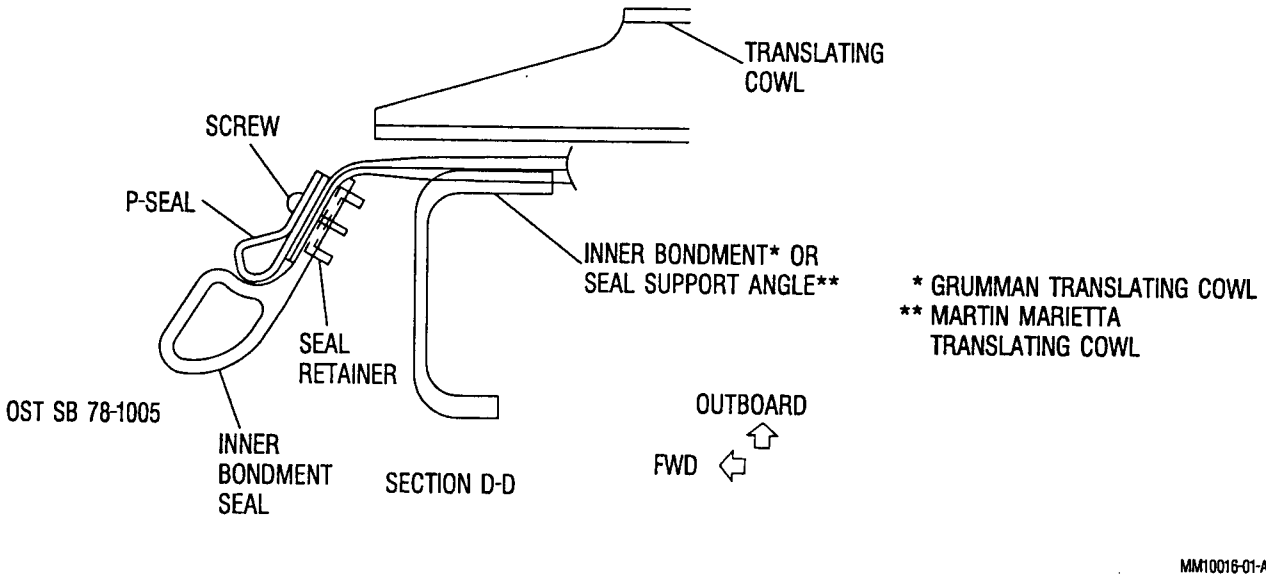
Inner Bondment Seal Installation (Sheet 2/3)
Figure 401





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Inner Bondment Seal Installation (Sheet 3/3)
Figure 401

the seal retainer. Tighten the screws hand-tight.

(9)Install six screws into the short P-seal segment, the inner bondment or seal support angle, the inner bondment seal, and the seal retainer. Tighten the screws hand-tight.

(10)At the two lowest holes in the inner bondment or seal support angle, install two screws into the inner bondment or seal support angle, the inner bondment seal, and the seal retainer. Tighten the screws hand-tight.

End Post SB GE78-1005

WARNING : DO NOT GET MATERIAL NO.C01-073 ON YOUR SKIN OR IN YOUR EYES. USE THIS MATERIAL IN AN AREA THAT IS OPEN TO THE AIR. WEAR CLEAN NYLON FILM OR POLYETHYLENE DISPOSABLE GLOVES WHEN YOU MIX OR APPLY THIS MATERIAL.

(11)Get two new end seal plugs. Apply Material No.C01-073, or equivalent, to the outer surface of each new plug.

(12)Install each new plug approximately 0.5 in. (12.7 mm) into each end seal.

(13)Install the new inner bondment seal on the end of the plug that you have access to. Make sure the inner bondment seal touches the end seal.

Pre SB GE78-1005

(14)On Martin Marietta translating cowls, use a No. 8 fastener 170-8 Apex tip to TORQUE the 48 screws to between 22 and 27 lbf.in. (0.25 and 0.31 m.daN).

(15)On Grumman translating cowls, use a No. 8 fastener 170-8 Apex tip to TORQUE the top screw and the lowest screw to between 22 and 27 lbf.in. (0.25 and 0.31 m.daN).

(16)On Grumman translating cowls, use a No. 8 fastener torque tip Apex tip to TORQUE the remaining 46 screws to between 22 and 27 lbf.in. (0.25 and 0.31 m.daN).

End Pre SB GE78-1005

Post SB GE78-1005

(14)Use a No. 8 fastener 170-8 Apex tip to TORQUE the two top screws and the two lowest screws to between 22 and 27 lbf.in. (0.25 and 0.31 m.daN).

(15)Use a No. 2X Phillips Apex tip to TORQUE the remaining 44 screws to between 22 and 27 lbf.in. (0.25 and 0.31 m.daN).

End Post SB GE78-1005

D. Close-Up

(1)Remove the bolts that attach the lockout plate to the CDU, and remove the lockout plate.

(2)Install a 0.25 in. (6.35 mm) square drive handle into the auxiliary drive pad of the CDU. Crank the translating cowl to the fully stowed position.

(3)Remove the 0.25 in. (6.35 mm) square drive handle from the CDU auxiliary drive pad.

(4)Install the lockout plate on the CDU. Install the two bolts and TORQUE to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(5)Engage the manual brake release lever on the CDU into its retaining clip.

(6)Connect the electrical cable to the directional pilot valve (DPV) solenoid.

(7)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(8)Close the thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
Remove the safety clips and tags and close the circuit breakers.

THRUST REVERSER DOOR OPENING MECHANISM - DESCRIPTION AND OPERATION

1. General

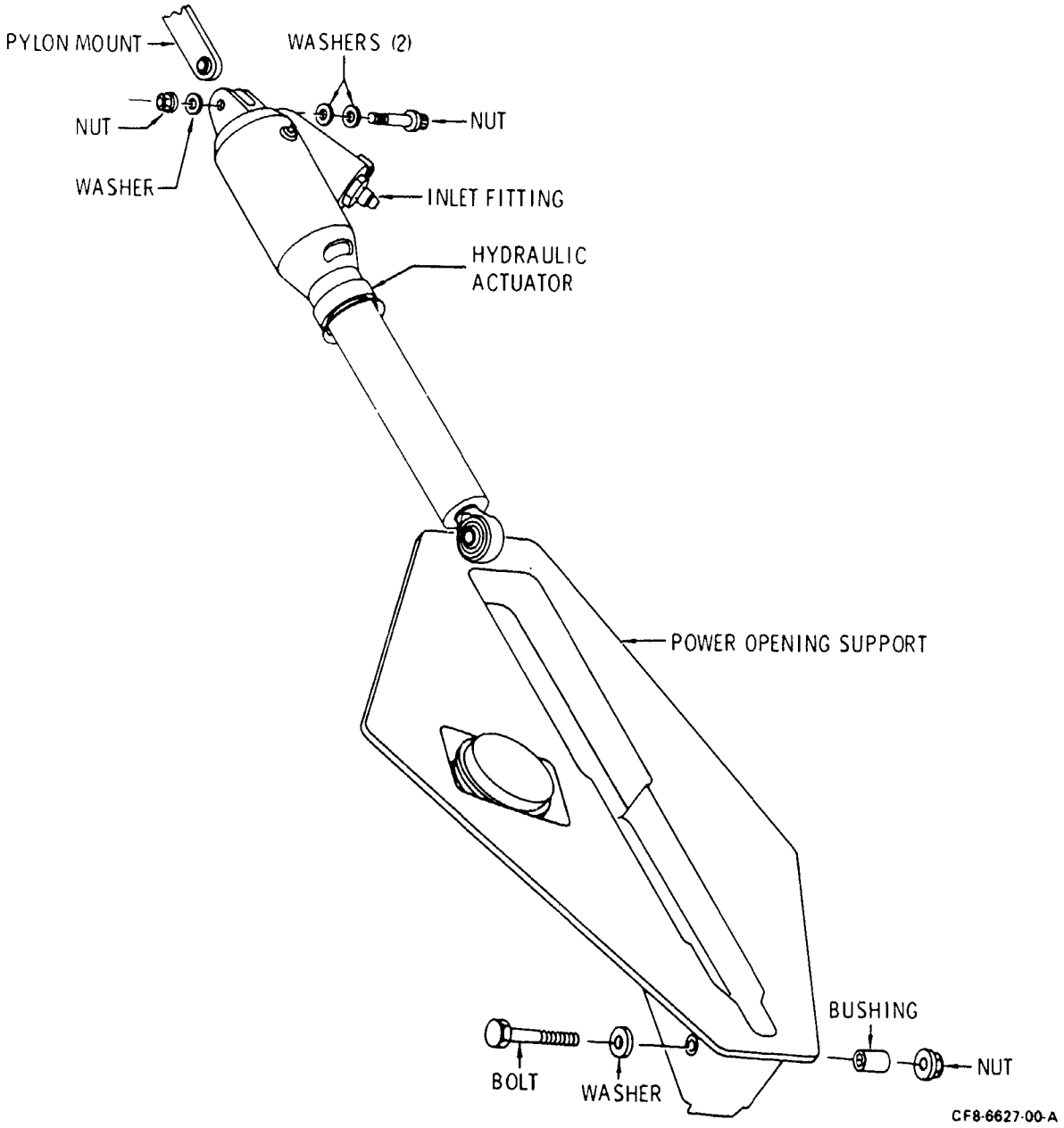
The opening system provides a means for opening the fan reverser halves to allow engine maintenance or removal.
Components of this system include hydraulic actuators, core cowl interlock valves, hard lines, multiple connectors, quick disconnects, relief valves and a hand operated hydraulic pump with an oil tank.

2. Description/Manual Operation (Ref. Fig. 001, 002, 003)

Two hydraulic actuators allow each reverser half to be opened independently for access to the core engine. The actuators are mounted on the aircraft pylon and push against the actuator mount forging on the duct sidewall.
This system normally opens the cowl door to 45 degrees in 70 seconds and can close the door at the operator's option, because of a variable OPEN-CLOSE valve on the pump.
The cowl interlock valves are a spool ON-OFF type that are actuated by the opening and closing of the core cowl via a cable assembly attached to the core cowl forward hinge. This valve precludes fan reverser or core cowl damage by preventing lowering the fan reverser and/or preventing raising the fan reverser off of the reverser hold open rod when the core cowl is not closed.

3. Customer Option/Automatic Operation (Ref. Fig. 004)

The customer option automatic opening power pack allows each reverser cowl to be opened independently without the need of any ground support equipment by simply operating an interlock valve/motor switch. The power pack contains a fluid reservoir, a pump driven by a 28 VDC motor, relief valve, check valves, and a filter.
Independent interlock valve/motor switches are rotated to activate the 28 VDC motor and open the fluid path to raise the respective reverser cowl. To lower the reverser cowl the valve/switch is rotated to only the fluid path allowing the fluid to backflow into the power pack reservoir.



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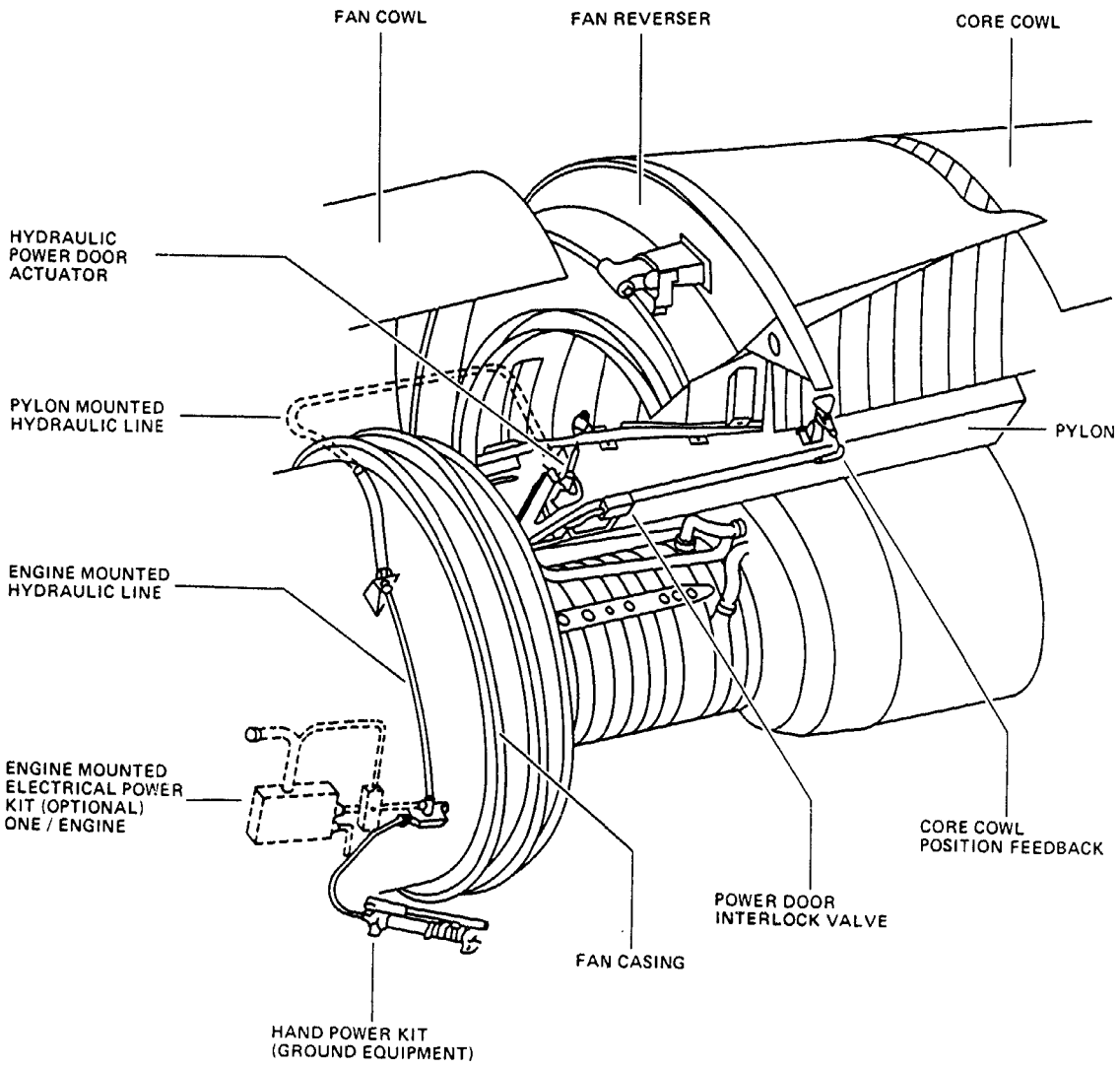
Thrust Reverser Cowl Opening Actuator
Figure 001



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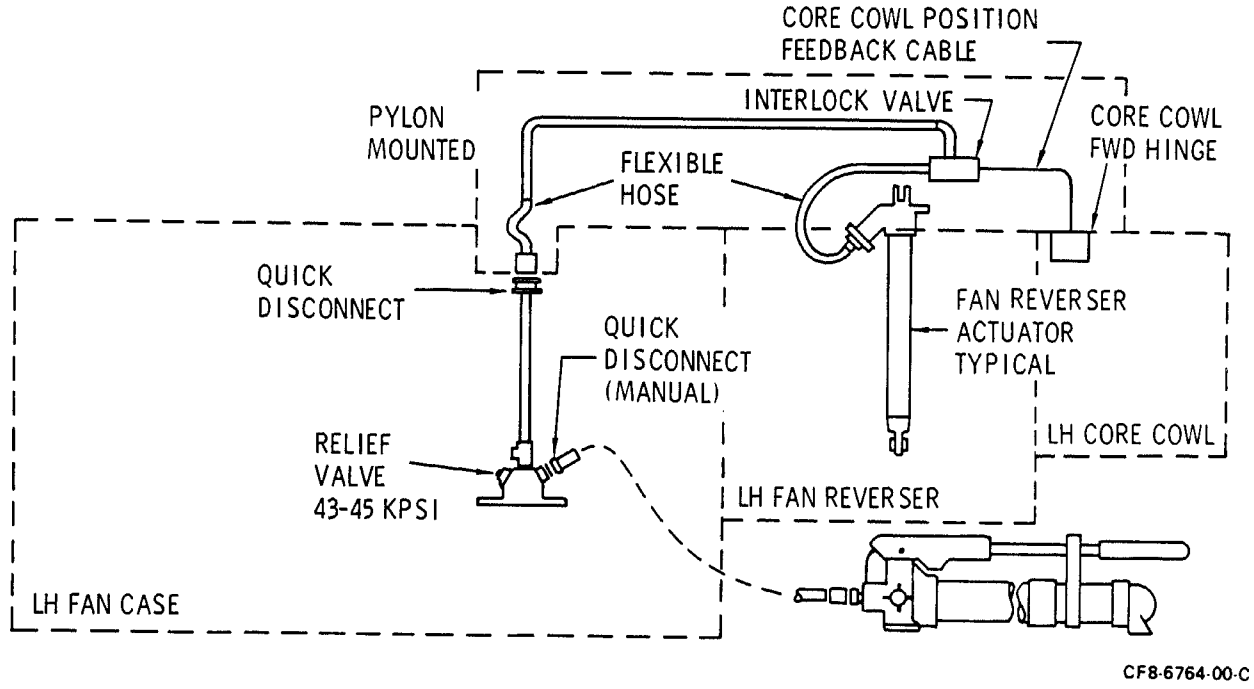
NOTE : SKETCH SHOWS EQUIPMENT FOR LEFT HALF OF REVERSER, RIGHT HALF IS SIMILAR EXCEPT THE "HAND POWER KIT" (OR (OR "ELECTRIC POWER KIT") SERVES BOTH HALVES.

Thrust Reverser Power Opening System
For Core Compartment Access
Figure 002



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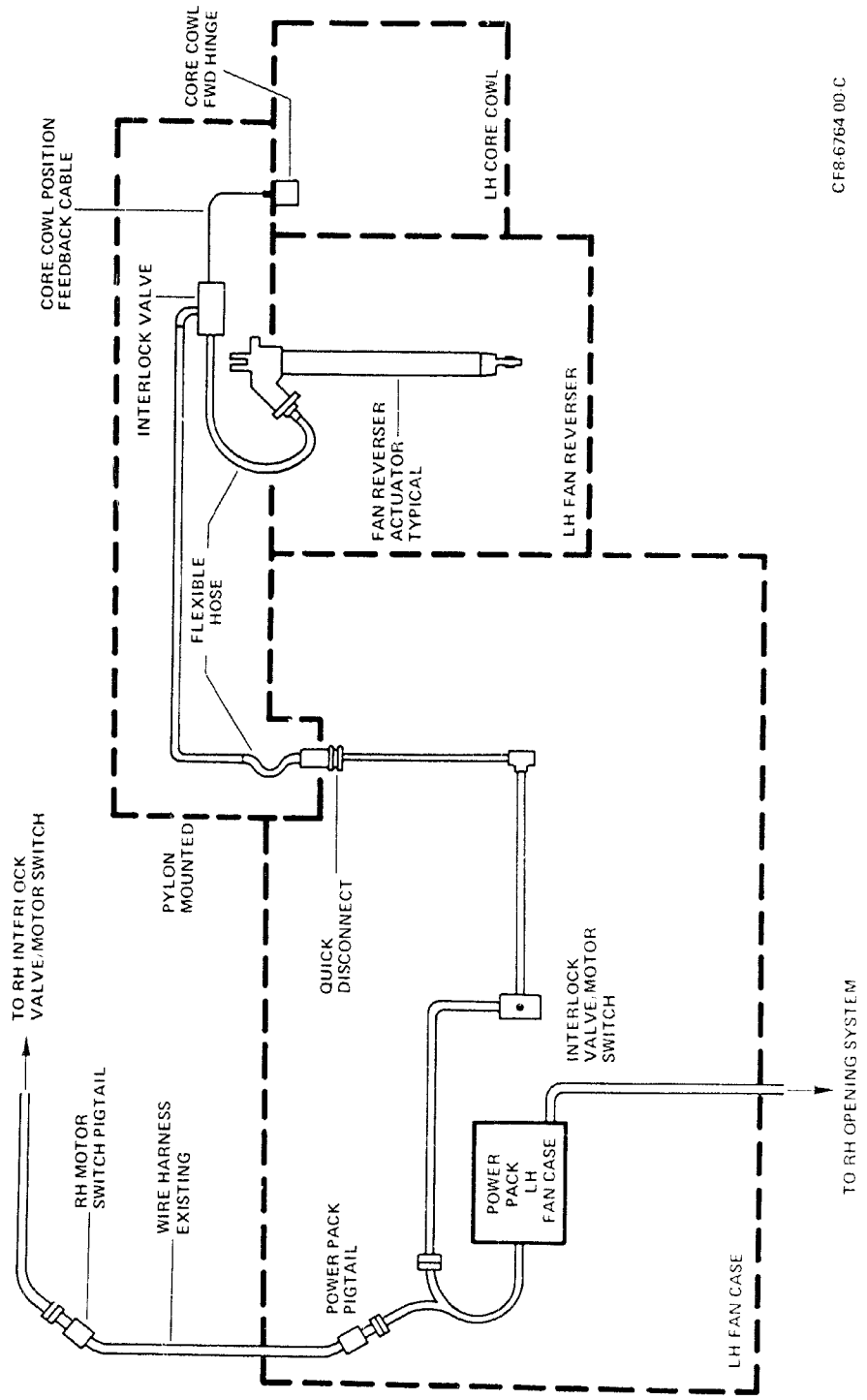
Thrust Reverser Cowl Door Opening
Figure 003



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Thrust Reverser with Automatic Cowl Door Opening
(Customer Option)
Figure 004

THRUST REVERSER DOOR OPENING MECHANISM - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A. Referenced Procedure - 71-13-00, P. Block 301	Access Platform Cowl Doors

2. Procedure

A. Job Set-Up
(1)Open safety and tag the appropriate circuit breakers and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Inspect the following :

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Oil Leakage from :		
(a)Actuator	Not serviceable	Replace actuator
(b)Flexible and hard hydraulic lines	Not serviceable	Replace line
(c)Hydraulic connectors	Not serviceable	Replace connector
(d)Relief valve	Not serviceable	Replace valve
(2)Flexible Hydraulic Line for :		
(a)Fraying	Not serviceable	Replace line
(b)Cracks	Not serviceable	Replace line

C. Close-Up
(1)Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

THRUST REVERSER DOOR OPENING HYDRAULIC ACTUATOR - MAINTENANCE PRACTICES

1. General

Maintenance of the cowl door hydraulic actuator is limited to Removal/Installation, Inspection/Checks, and Approved Repairs.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C03-006	Finishes and Protective Coatings (Ref. 70-00-00)
or Material No.C03-045	Finishes and Protective Coatings (Ref. 70-00-00)
C.	Access Platform
D. Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
E.	Containers, Stainless Steel (300 series) or Polyethylene
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuits breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(2) Install access platform.

B. Removal (Ref. Fig. 201)

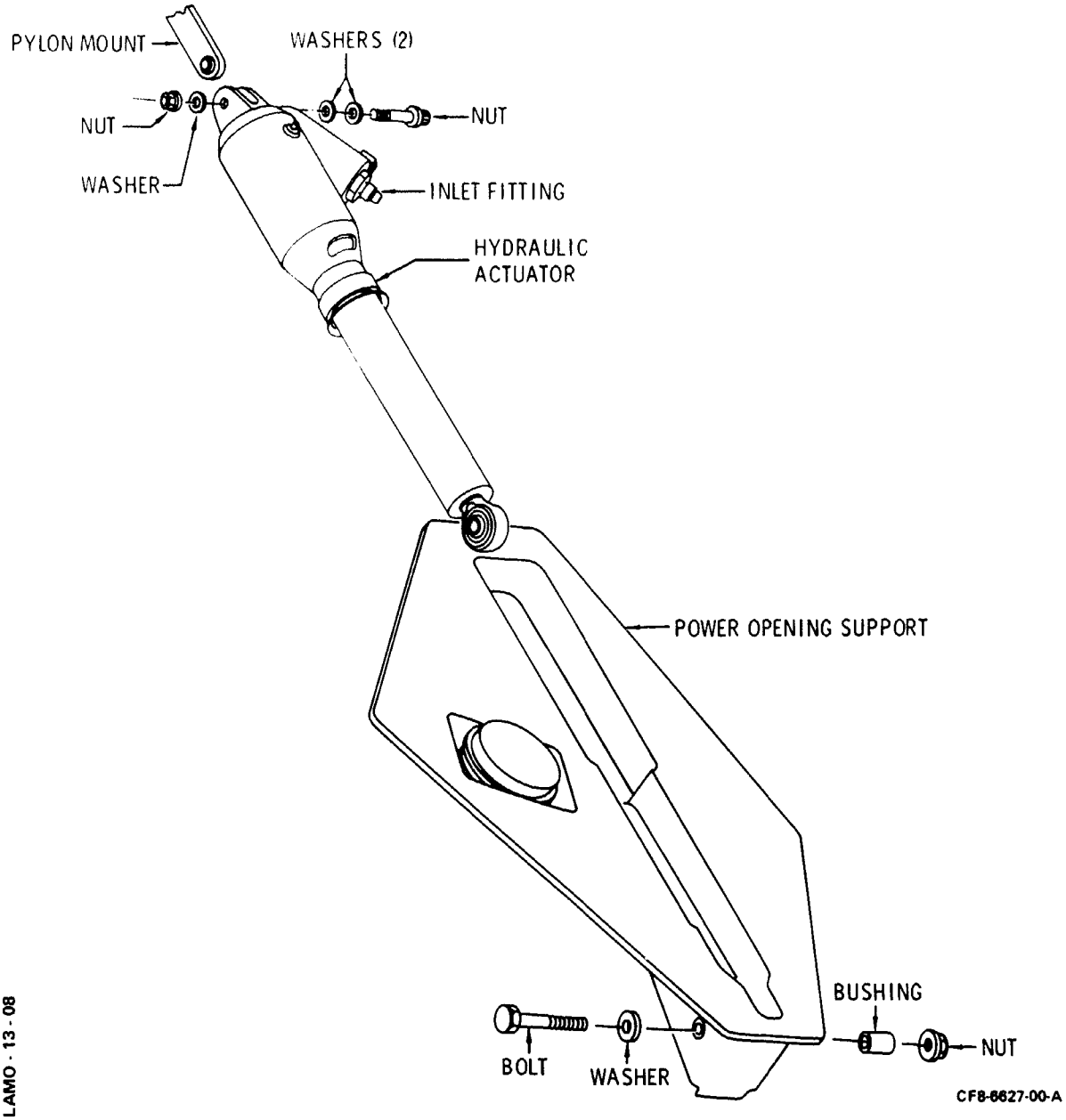
WARNING : USE FAN REVERSER COWL DOOR HYDRAULIC POWER OPENING SYSTEM 2C6983P07 ONLY FOR OPENING AND CLOSING THE REVERSER HALVES. THE SYSTEM SHOULD NEVER BE USED AS A HOLD OPEN DEVICE. ALWAYS SECURE EACH OPENED REVERSER HALF WITH AN APPROVED BRACE OR HOLD OPEN ROD, AS DIRECTED BY THE INSTRUCTIONS BELOW, TO PREVENT SERIOUS INJURY DUE TO ACCIDENTAL OR INADVERTENT CLOSURE. KEEP ALL PERSONNEL CLEAR OF AREAS UNDER AND BETWEEN REVERSER HALVES DURING OPENING AND CLOSING CYCLES.

(1) Remove flexible hydraulic hose from actuator fitting, and cap hose end and actuator fitting.

(2) Remove bolt, washers, and nut securing actuator to the pylon mount.

(3) Remove bolt, washer, and nut securing actuator to the cowl bracket and remove actuator.

C. Inspection/Check



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Cowl Door Hydraulic Actuator - Removal/Installation
Figure 201

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)All Areas for :		
(a) Cracks	None allowed	Replace actuator
(2)Bearings for :		
(a) Binding	None allowed	Replace actuator
(3)Oil leakage	2 drops per 25 cycles maximum	Replace actuator
(4)All Areas for :		
(a)Bare surfaces (Alodizing agent color not there)	None allowed	Repair (Refer to Para. D.(2))

D. Approved Repairs

(1)Repair thread damage within serviceable limits by blending with a fine stone.

(2)Apply alodizing agent to bare areas.

WARNING : DO NOT USE MATERIAL No.C04-001 NEAR FLAMES OR HEAT. THE SOLVENT IS FLAMMABLE. DO NOT BREATH THE FUMES RELEASED FROM MEK. THE FUMES ARE DANGEROUS TO YOUR LUNGS. MAKE SURE YOU HAVE A GOOD FLOW OF AIR. DO NOT LET MEK STAY ON YOUR SKIN. MEK IS DANGEROUS TO YOUR SKIN AND EYES.

(a)Clean the surface with a clean brush or cloth and Material No.C04-001.

(b)Sand the area lightly with 180-grit, aluminum oxide abrasive paper.

WARNING : DO NOT PERMIT THE ALODIZING SOLUTION TO TOUCH ORGANIC SOLVENTS. IT CAN START IGNITION OF THE ORGANIC SOLVENTS.

WARNING : DO NOT LET THE ALODIZING SOLUTION TOUCH YOUR BODY OR CLOTHES, BECAUSE THE SOLUTION IS DANGEROUS TO YOUR SKIN AND EYES. DO NOT BREATH THE FUMES RELEASED FROM THE SOLUTION. THE FUMES ARE DANGEROUS TO YOUR LUNGS. MAKE SURE YOU HAVE A GOOD FLOW OF AIR. THE FUMES CAN MAKE YOU DIZZY AND SICK.

CAUTION : DO NOT USE LEAD OR GLASS CONTAINERS TO MIX OR KEEP THE ALODIZING SOLUTION IN.

(c)Dissolve Material No.C03-006 or Material No.C03-045 fully in water. Mix the solution with a hard rubber paddle or stir rod.

(d)Mix Material No.C03-006 or Material No.C03-045 with a 70 percent concentration of nitric acid in a stainless steel (300 series) or other acid - resistant container. Add acid until the pH is 1.9 - 2.1.

(e)Keep the solution in polyethylene or stainless steel containers.

NOTE : A small quantity of material can become disconnected from the solution. Ignore this.

(f)Let the solution set for at least one hour before use.

(g)Use a nylon-bristle brush, cellulose sponge, or spray equipment to apply the solution. Keep the area wet with the solution until a layer is fully formed.

NOTE : The layer is usually gold in color. This can be different with different alloys and procedures. If the layer is powdery, the

treatment time was longer than necessary. Remove the powdery layer and apply a new layer.

CAUTION : DO NOT LET THE ALODIZING SOLUTION TOUCH METALS OTHER THAN ALUMINUM. THE SOLUTION IS HIGHLY CORROSIVE.

(h)Flush the part with clean water to fully clean the solution from the actuator. The part can also be put fully into a container of clean water (120-140.5° F. (49-60.5° C.)) or cleaned with a wet sponge. Do not permit liquids to stay in cavities or depressions in the part.

CAUTION : BE CAREFUL NOT TO SCRATCH OR RUB OFF THE LAYER OF ALODIZING SOLUTION, WHICH IS EASILY DAMAGED WHEN NEW.

(i)Dry the part with pressure air or with a clean, soft cloth.

CAUTION : DO NOT PERMIT MATERIALS USED TO APPLY OR REMOVE THE ALODIZING SOLUTION TO DRY. THESE MATERIALS CAN BURN WHEN DRY. IMMEDIATELY AFTER USE, SOAK THESE MATERIALS FULLY IN WATER BEFORE YOU DISCARD THEM.

(j)Keep the alodizing solution in a plastic container. It will deteriorate in glass or steel containers.

E. Installation

(1)Position actuator in cowl bracket with input fitting facing forward.

(2)Install bolts through the rod end mount and the cowl bracket and secure with washers and nuts. TORQUE bolts to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN)

(3)Align clevis holes of actuator with hole in pylon mount uniball extending actuator rod as required.

(4)Install bolt, washers and nut through clevis and uniball. Use 2 washers under bolt and one washer under nut. TORQUE nut to between 80 and 100 lbf. in. (0.9 and 1.13 m.daN).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Remove access platform.

(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

(4)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.

RELIEF VALVE - REMOVAL/INSTALLATION

1. General

A. Each fan reverser cowl door opening system has a relief valve installed in the multiple connector for each system. The multiple connectors are installed on the aft fan case at 5 and 7 o'clock positions. Access to the multiple connectors is gained by opening the left and/or right fan cowl.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench 180 and 200 lbf.in. (2.03 - 2.26 m.daN).
C. Material No.C02-019	Anti-Seize Compounds, Lubricant, Oils (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure (Ref. Fig. 401)

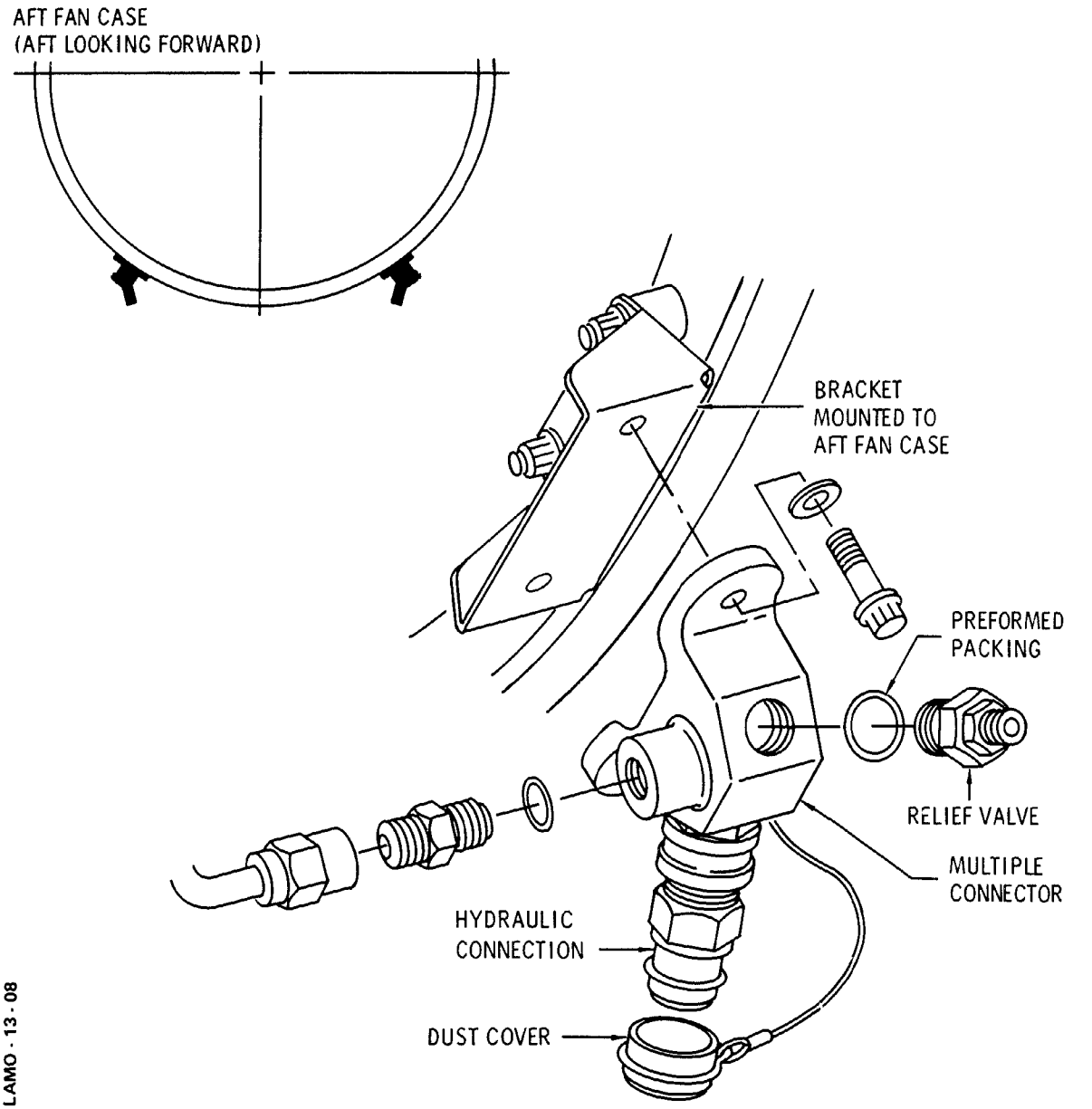
NOTE : The removal/installation procedure is identical for either the left or right hand relief valve.

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal
(1)Remove lockwire from relief valve and remove relief valve from multiple connector.
(2)Discard preformed packing from removed relief valve.

C. Installation
(1)Install new preformed packing onto relief valve and lubricate with engine oil (C02-019).
(2)Install relief valve into the multiple connector. TORQUE to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).
(3)Wirelock relief valve.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers for the appropriate engine. Close fan cowl doors (Ref. 71-13-00, P. Block 301).



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Relief Valve - Removal/Installation
Figure 401

INTERLOCK VALVE - MAINTENANCE PRACTICES

1. General

Maintenance of power door opening system interlock valve is limited to removal/installation, adjustment/test and inspection/check. The interlock valve(s) are mounted on brackets attached to the pylon floor at station 245.710. Access to the valve(s) is gained by opening the thrust reverser cowls.

2. Equipment and Materials

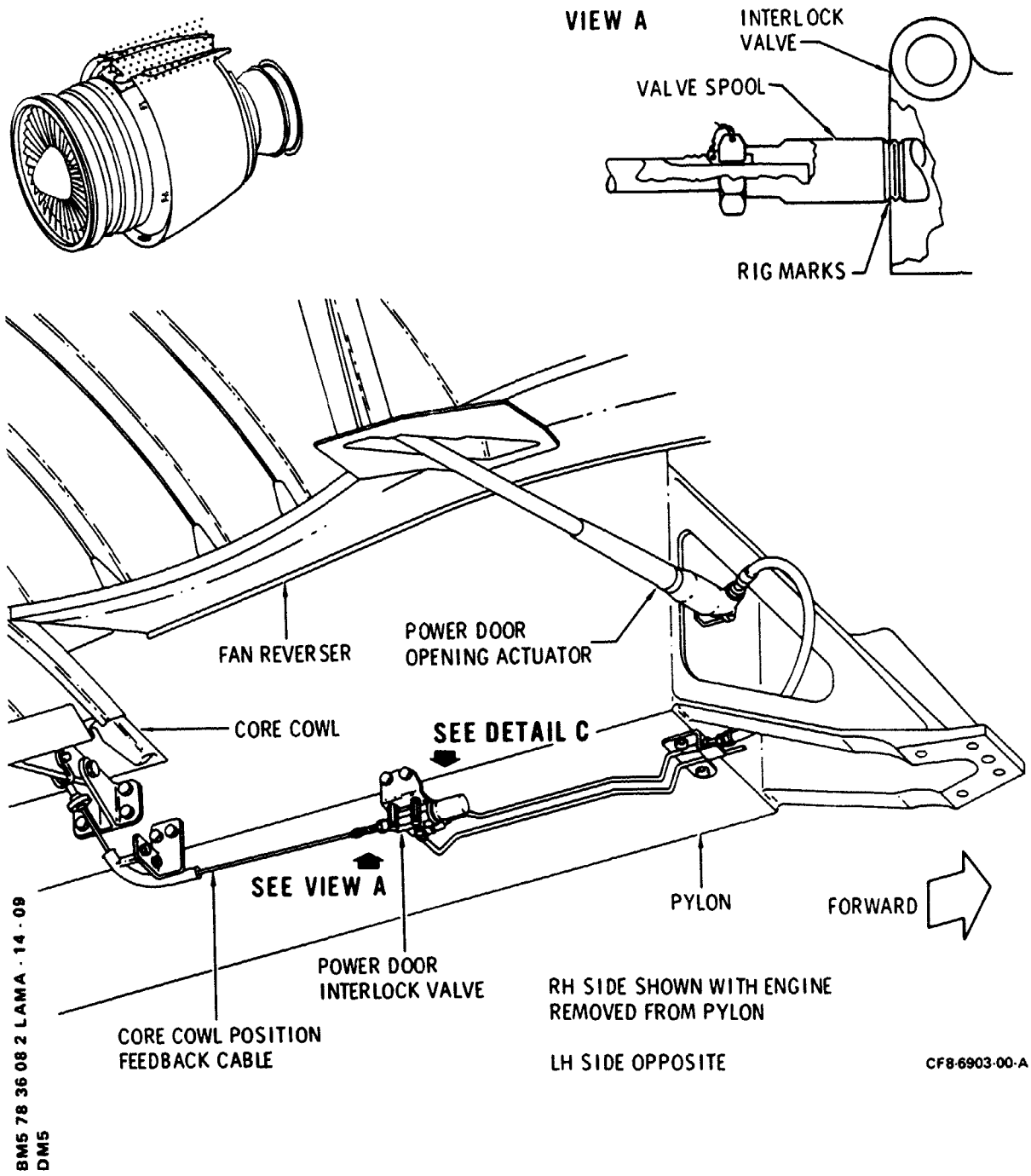
ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
C. Material No.C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open thrust reverser fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform

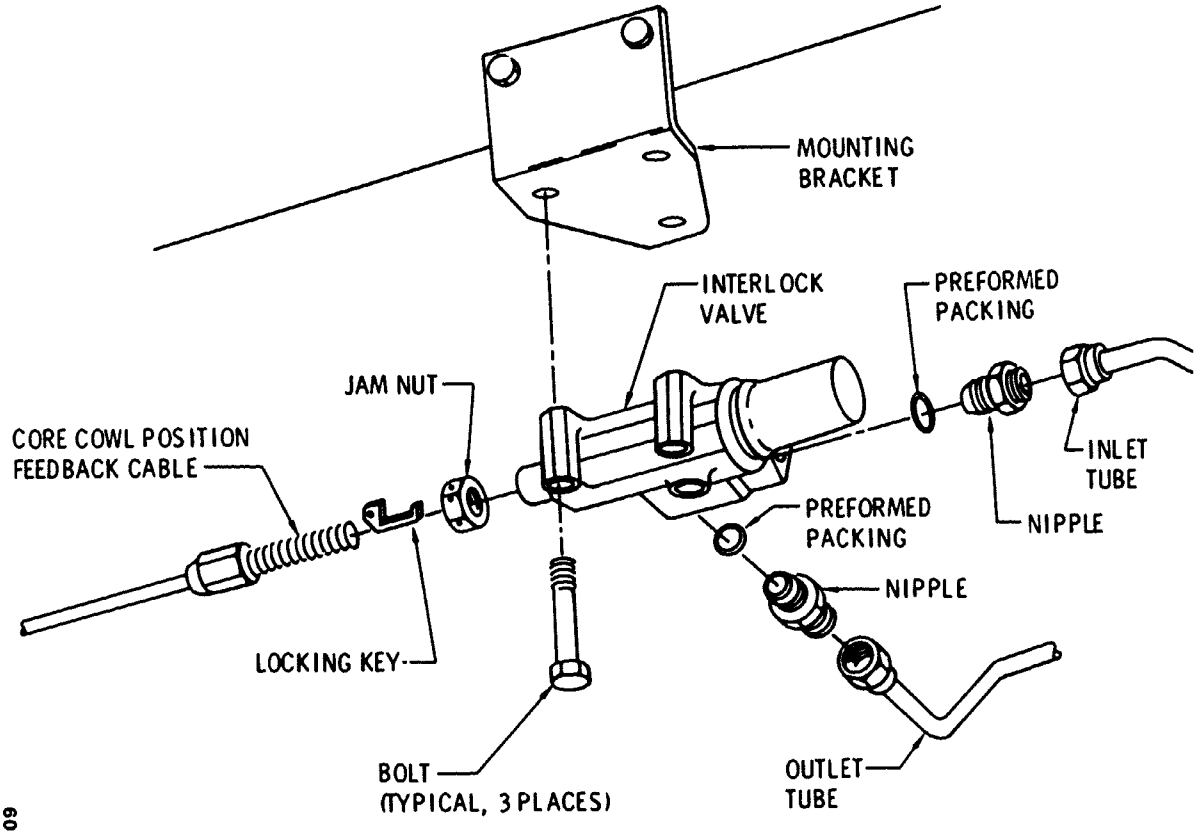
B. Removal (Ref. Fig. 201)
(1)Disconnect the inlet and outlet tubes from the interlock valve and plug or cap all openings.
(2)Remove lockwire from jam nut securing core cowl position feedback cable to the interlock valve and loosen the jam nut to allow the locking key to disengage from the slot in the end of the valve spool.
(3)Remove core cowl position feedback cable by turning the hex wrenching surface on the valve end of the cable.
(4)Remove the 3 bolts securing the interlock valve to the pylon mounting bracket and remove interlock valve.
(5)Remove and retain inlet and outlet nipples for reuse if serviceable. Discard old preformed packings from nipples.

C. Installation (Ref. Fig. 201)
(1)Lubricate new preformed packings with engine oil (C02-019) and install onto inlet and outlet nipples. Install nipples into interlock valve and TORQUE to between 135 and 150 lbf. in. (1.52 and 1.69 m.daN).
(2)Place interlock valve on pylon mounting bracket and secure with 3 bolts. TORQUE bolts to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN).
(3)Connect inlet and outlet tubes to interlock valve. TORQUE tube B-nuts to between 135 and 150 lbf. in. (1.52 and 1.69 m.daN).
(4)Partially thread the core cowl position feedback cable into the interlock valve spool and rig per paragraph 4.



Interlock Valve - Removal/Installation (Sheet 1/2)
Figure 201

DETAIL C



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Interlock Valve - Removal/Installation
(Sheet 2/2)
Figure 201

4. Adjustment/Test

A. Rigging Interlock Valve (Ref. Fig. 201)
(1)Place core cowl in full hold open position.
(2)With the jam nut on threaded end of the core cowl position feedback cable loosened, thread the cable into the valve spool until rig mark on valve spool is visible outside the valve body.
NOTE : There are two rig marks on the valve spool but only the first one is used as reference.
(3)Thread the jam nut toward the valve spool, making sure that the locking key engages the slot in the end of the valve spool. TORQUE jam nut to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN) and wirelock to locking key.

5. Inspection/Check

A. Visually inspect the interlock valve for the following

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMIT	REMARKS
(1)All areas for :		
(a)Cracks	None allowed	Replace valve
(2)Valve spool for :		
(a)Binding	None allowed	Replace valve
(b)Spring Pressure	Must be capable of retracting spool fully	Replace valve
(c)Oil leakage	None allowed	Replace valve

6. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close core cowl, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

CORE COWL POSITION FEEDBACK CABLE - MAINTENANCE PRACTICES

1. General

Maintenance of the core cowl position feedback cable assembly is limited to removal/installation, adjustment/test and inspection/check. The cable assembly is connected to the forward core cowl hinge by a clevis and on the other end, threads into the core cowl interlock valve. Access to the cable assembly is gained by opening the thrust reverser and the core cowls

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Access Platform
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 78-36-08, P. Block 201	Interlock valve

3. Procedure

A. Job Set-Up
(1) Open, safety and tag circuit breakers for the appropriate engine and open fan, thrust reverser and core cowl doors (Ref. 71-13-00, P. Block 301).
(2) Install access platform

Pre SB GE 78-064 *** (NONADJUSTABLE MOUNTING BRACKET)

B. Removal (Ref. Fig. 201)
(1) Disconnect cable clevis end from the core cowl forward hinge by removing the cotter pin, washer and straight pin.
(2) Disconnect threaded cable end from the interlock valve by removing lockwire from the jam nut locking key and loosening the jam nut. Unthread cable from valve spool and retain jam nut and locking key for reuse if serviceable
(3) Remove the cable guide from the pylon mounting bracket by removing the two bolts and removing the cable assembly

C. Installation (Ref. Fig. 201)
(1) Place cable guide on pylon mounting bracket and secure with two bolts. TORQUE bolts to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN).
(2) Install locking key and jam nut onto the threaded end of the cable and thread cable partially into the valve spool.
(3) Connect clevis end of cable to the core cowl forward hinge and secure with straight pin, washer and cotter pin.
(4) Rig cable assembly to interlock valve (Ref. 78-36-08, P. Block 201).

End Pre SB GE 78-064

Post SB GE 78-064 *** (ADJUSTABLE MOUNTING BRACKET)

B. Removal (Ref. Fig. 201, 202)
(1) Remove the cotter pin, washer, and straight pin from the clevis at the core cowl forward hinge.

(2)Remove the lockwire from the jam-nut locking key and loosen the jam-nut at the interlock valve.
(a)Loosen the cable from the valve spool. Keep the jam-nut and the locking key for installation if they are serviceable.
(3)Remove the two bolts and washers from the mounting bracket.
(a)Disconnect the cable guide from the mounting guide.

C. Installation (Ref. Fig. 201, 202)
(1)Install the cable guide on the mounting brackets.
(a)Put the washers on the bolts and TORQUE the bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(2)Install the locking key and the jam-nut into the threaded end of the cable at the interlock valve.
(a)Turn the cable into the valve spool, but do not fully tighten.
(3)Install the clevis to the core cowl forward hinge and connect it with the straight pin, washer, and cotter pin.
(4)Adjust the cable assembly to the interlock valve (Ref. 78-36-08, P. Block 201).

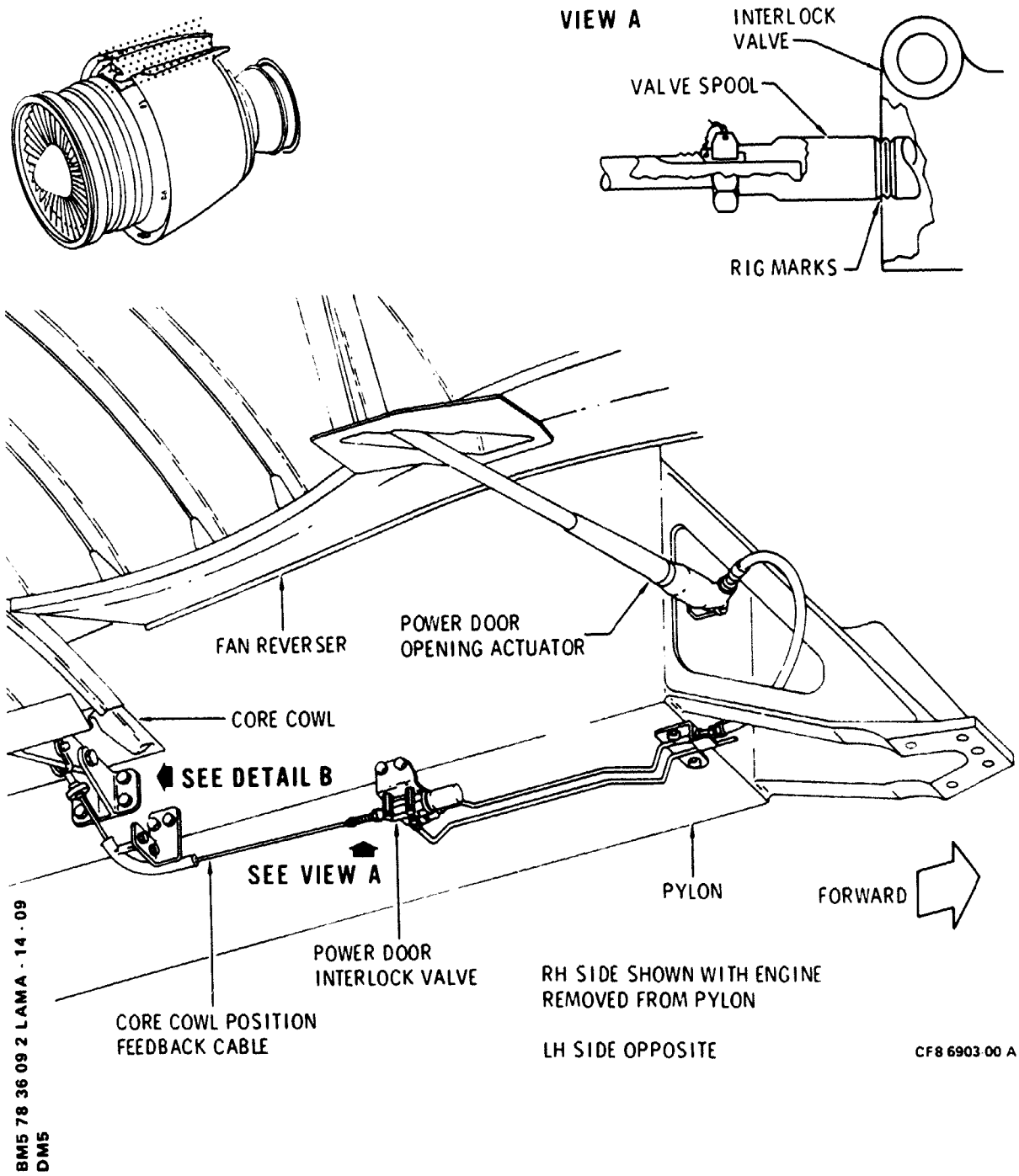
End Post SB GE 78-064

4. Inspection/Check

A. Visually inspect the cable assembly for the following :

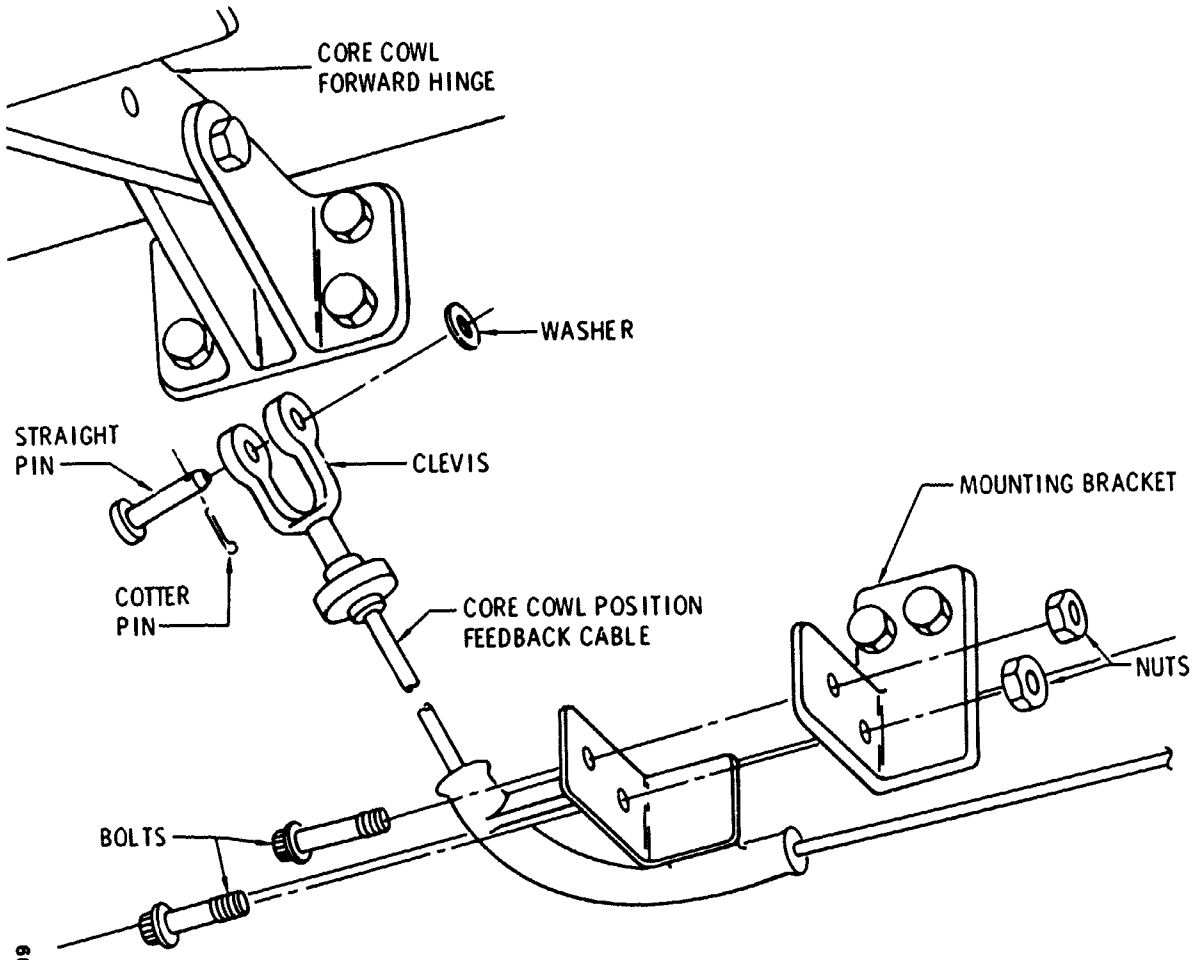
INSPECT/CHECK	MAXIMUM SERVICEABLE LIMIT	REMARKS
(1)Clevis for :		
(a)Cracks	None allowed	Replace cable assembly
(2)Cable guide and bracket for :		
(a)Cracks	None allowed	Replace cable assembly
(b)Missing Teflon in guide tube	None allowed	Replace cable assembly
(3)Threaded cable end for :		
(a)Crossed thread	None allowed	Replace cable assembly
(b)Nicked threads	Any amount not beyond the complete depth of thread	Chase threads or replace cable assembly

5. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.



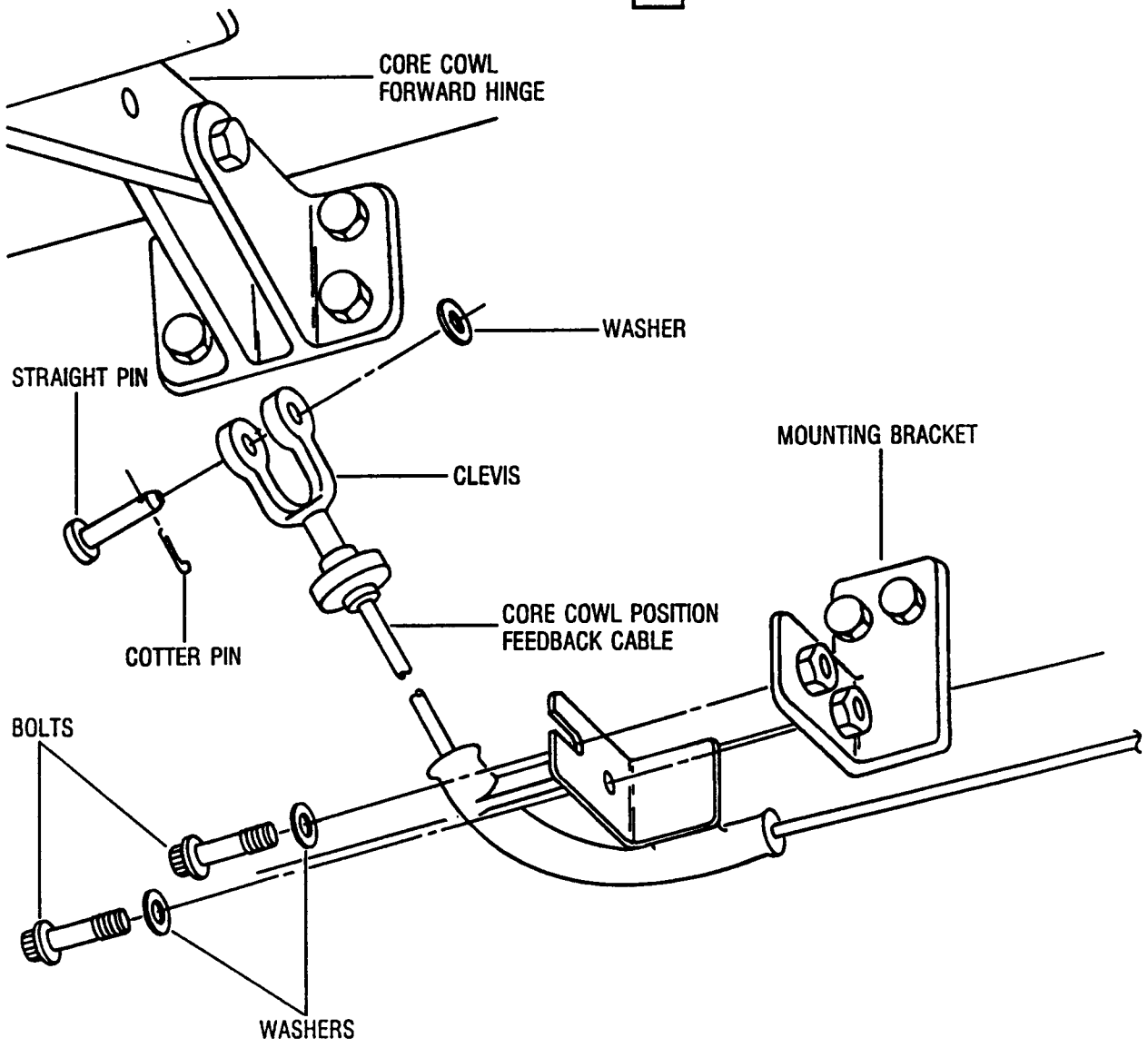
Core Cowl Position Feedback Cable - Removal/Installation
(Sheet 1/2)
Figure 201

DETAIL B



Core Cowl Position Feedback Cable
(Pre SB GE 78-064) (Sheet 2/2)
Figure 201

B



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Core Cowl Position Feedback Cable
(Post SB GE 78-064)
Figure 202

(3)Close core cowl, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.